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Abstract:

While audience and participation surveys, as well as econometric demand studies, generally confirm that performing arts audiences are relatively elite, there are surprises. Education (despite conflicting causal interpretations) is a stronger determinant than income, but that evidence is more reliable from survey results than from econometric estimation, and arts training is often distinguished from formal education. The arts as luxury goods can only be confirmed by those rare studies controlling for the value of time, and price elasticities are often higher than expected, especially when more disaggregated data are examined. Price inelastic demand is more likely the result of low pricing strategies of non-profit arts managements rather than any inherent result of an acquired taste for the arts, while cross-price elasticity evidence is relatively weak, even within the performing arts. Arts demand cannot adequately be estimated without also considering "life-style" variables, or non-standard socioeconomic factors such as sexual orientation, gender and socialization processes, and even the role of age has been notably complex. Quality of arts performance or organization seems important, but the econometric results are mixed. Habit formation must be distinguished from learning-by-consuming and rational addiction in examining dynamic determinants. Sociologists, psychologists, and marketing specialists, as well as economists, have contributed to this literature, which remains unusually enigmatic despite about forty years of increasingly sophisticated analysis.

1. Introduction

When readers of *La Scena Musicale* were informed that "...the likelihood of money being spent on orchestral music is linked to consumers' increasing age, education and income" (Ehrensaft, 2001, p.1) they could hardly have been shocked.[1] The "high arts" are widely viewed as the domain of a minority of elites**,** long an argument used by opponents of government arts subsidization to characterize such support as regressive, and ironically also by proponents who stress the need to make culture more accessible to the general public. Furthermore, one might suspect that this consensus and conventional wisdom would render efforts to conduct empirical studies of the demand for the arts relatively useless - at best, carefully designed confirmations of the obvious.

This chapter is designed to evaluate that suspicion, and finds surprising evidence of contradictory results, personally held convictions that are inconsistent with the empirical evidence, and significant popular misconceptions about the findings in some of the most cited empirical studies. It is ironic that the empirical demand studies component of the cultural economics literature - commonly viewed as relatively technical and less subject to disagreement and normative posturing - seems to be characterized by both faith and science, and is not immune to the attractions of a kind of mythology. Lévy–Garboua and Montmarquette, themselves significant contributors to this literature, reflect this best when they observe:

> "It is likely that the demand for the arts is price-elastic and art is a luxury good. But this prediction stems more, as yet, from a theoretical conjecture than from well-replicated empirical estimates" (2003, p. 211).

While it must be noted that theory does not unambiguously make those predictions, they also suggest that we have not yet clarified whether arts goods have close substitutes, hence suggesting that we are still "groping towards firm answers" to three of the most basic empirical questions regarding arts demand (2003, p. 201).

It is clear that we expect carefully done empirical analysis to clarify our expectations about arts demand, and even *La Scena Musicale* cited regression equations as the source of the understanding of the role of age, education and income rather than merely deferring to conventional wisdom and casual observation. Of course, the word empirical in "empirical studies" should not be narrowly interpreted as requiring multivariate regression analysis. The Collins English Dictionary (2000) defines empirical as "derived from or relating to experiment and observation rather than theory." This is clearly broader than what economists mean by econometric modeling - the use of statistical and mathematical methods to estimate parameters in

[1] Although they might have been surprised by the optimistic tone of the article, citing demographer David Foote as demonstrating that "aging baby boomers" and the "graying of classical music audiences" will be a "valuable asset" that will ultimately lead to an increase in the classical music market (Ehrensaft, 2001, p. 1).

an effort to verify or refute economic theories. It is consistent with the Corning and Levy (2002, p. 218) observation that "studies of demand for the performing arts typically take one of two basic approaches: survey studies which seek to characterize the demographics of theater [and other] patrons and econometric studies which seek to quantify demand and income elasticities," although it is notable that data for econometric studies are often derived, at least in part, from either audience or arts participation surveys.[2]

However, while "income and price elasticities... are the usual end-products of empirical demand analysis" (Barten, 1992, p. 21), a substantial portion of the econometric literature related to arts audiences and arts consumption patterns does not derive such elasticities. For example, while Table 11 (part 3) documents the 29 of the 44 regression based studies that report some kind of demand elasticities, only 19 (43.2 percent of the larger total) estimated both own price and income elasticities (many of which were not statistically significant), and fewer still also estimated any cross price elasticities (see Table 15 below). Thus, a notable part of the arts demand econometric literature is devoted instead to more broadly examining the competing determinants of arts attendance or participation patterns without any formal link to the neoclassical theory of consumer behavior and its related concerns with formal homogeneity or aggregation constraints.[3]

Thus, this survey reports a wide variety of empirical findings not narrowly limited to the economic literature but incorporating important contributions from other fields, including those from econometric models, audience and arts participation surveys, and simple compilations of descriptive statistics. The arts are defined primarily as the non-profit performing arts (orchestral

[2] For a good roundtable discussion of the difficulties in accurately conducting such surveys, see Horowitz (1985).

[3] Even the standard demand studies that do estimate price, cross price, income and other elasticities are faced with sufficient data and econometric challenges such that sensitivity to ensuring that estimated demand functions are homogeneous of degree zero while also meeting Engel and Cournot aggregation conditions is a luxury few can afford. While not estimating the determinants of attendance directly, Pommerehne and Kirchgassner (1987) is a rare example of using almost ideal demand system restrictions to estimate expenditure shares for cinema, theater and an all other goods composite in a multi-equation demand system. The general absence of such restrictions can indeed complicate the interpretation of the results, especially regarding the controversial issue of price elasticities in the performing arts. However, many of the conclusions regarding other important issues such as the relative roles of income vs. education, "full price" versus admission price, specific arts training vs. general levels of education, in-school arts training vs. family influence, the complex and changing role of age, and standard socioeconomic vs. the dizzying array of "lifestyle" and other socialization proxies for taste variations, are relatively similar regardless of statistical technique (e.g. discriminant, cluster, factor or multivariate regression analysis of differing specifications), or regardless of the field of specialization of the researcher (e.g., economics, sociology, arts policy, psychology, or marketing). Thus, the practical importance of this technical limitation in formal demand estimation should not be exaggerated, even if it does complicate the derivation of the standard demand elasticities.

and chamber music, opera, ballet and modern dance, and theater, but also including for-profit Broadway), although comparisons are made with the largely for-profit media arts and other forms of recreation and entertainment, including sports. While another chapter in this *Handbook* is exclusively devoted to museums (Frey and Meier, Ch. 10), some of the literature on museum demand and pricing controversies is reviewed in order to identify common vs. unique factors influencing demand across arts forms.[4] No effort is made to address the unique issues affecting the market for paintings, sculptures, and related art objects generally sold in auction markets.[5]

Also, this chapter deals exclusively with the private demand for the arts, most typically measured by attendance and related measures, or by participation rates. This is not the forum for a consideration of public demands for the arts linked to social benefits, economic impact studies, contingent valuation methods, or any other methods designed to assess the degree of potential market failure that might justify tax financed support. Understanding the factors determining (and limiting) the private demand for the arts, and complicating the ability of arts organizations to capture adequate "earned" revenue from direct arts consumers, is useful to put such public demand studies into a broader context. However, the potential public goods aspects of the arts and the magnitude of marginally relevant external benefits going beyond direct consumption benefits is beyond the scope of this chapter, but is considered in Section VI of this *Handbook.*

The organization is as follows. Part 2.1 provides an overview of the basic socioeconomic and demographic survey findings about arts audiences and the demand for the arts, identifying both common and unique factors across different performing arts forms, as well as a review in section 2.2 of the evidence regarding audience overlap and "co-patronage" linked to so-called segmentation studies. It is shown that, while the conventional wisdom has at times been confirmed, the empirical results from even this largely descriptive literature have been rich and at times unexpected. The degree to which such socioeconomic findings (focusing on age, occupation, education and income) have remained similar from the earliest studies (essentially from the mid- 1960's) to the most recent is addressed in section 2.3, along with a brief evaluation of the evidence for arts "booms" versus arts "busts" and the role that supply factors may play in affecting arts demand (although supply issues are also referred to in the discussion in Part 3 regarding the relative merits of single equation versus simultaneous equation estimation of demand functions for the arts).

Part 3.1 provides a detailed summary of the econometric literature, including efforts to estimate specific demand functions. An overview of the price elasticity results from those studies is presented in Part 3.1.1, focusing on the effects that different levels of aggregation and audience

[4] There is also modest overlap with the section concerning revenues in the *Handbook* chapter on "Nonprofit Firms in the Performing Arts"(Brooks, Ch.8).

[5] Art auctions are covered in *Handbook* Ch. 16 (Ashenfelter and Graddy), while art as an investment is the subject of "Prices and Returns for Art in Ch. 17 (Ginsburgh, Mei and Moses). The comparisons made between demand for the performing arts and the media arts also require modest overlap with some of the topics covered in the Cultural Industries section V.

segmentation have on the empirical results. Theoretical issues essential to the interpretation of the price elasticity results are addressed in 3.1.2, followed in 3.1.3 by an overview of the income elasticity differences resulting from different levels of aggregation in the data. The technical challenges that have faced researchers in conducting empirical arts demand studies are addressed in 3.2, subdivided into five sections focusing upon (1) the data and model specification problem, including the role of the value of time in consumption, and single equation versus simultaneous equation estimation; (2) the multicollinearity problem, which presents especially difficult challenges in separating the effects of income and different measures of education, while also complicating the unique role of age; (3) the related problem of incorporating dynamic issues linked to taste cultivation, the role of human capital, and rational addiction versus learning-by-consuming ; (4) the market definition problem focusing on product and geographic substitutes, possibly relevant complements, and the limited evidence regarding cross-price elasticities of demand; and (5) the product quality problem, a common challenge that seems to be particularly important in the arts. Part 3.3 addresses the view held by some that "life-style" and various socialization measures are more important determinants of the variation in arts consumption behavior than are the traditional socioeconomic determinants of age, income, education and occupation. "Mixed" factors such as gender, race and ethnicity, religious affiliation, and sexual orientation combine with other variables to complicate that analysis. The debate regarding socioeconomic vs. life-style socialization determinants of arts audiences has often proceeded without a consideration of the fundamental demand determining variables of product price, the prices of substitutes and complements, and product mix and quality factors that are more closely linked to the demand functions of specific sellers of performing arts services.

A concluding summary and evaluation focuses on an assessment of the Lévy-Garboua and Montmarquette (2003, p. 211) claim that three main developments are required before more definitive answers can be given to questions about the demand for the arts: (1) more careful econometric work; (2) the increased use of large data sets; and (3) the "more intensive use of explicit models of the cultivation of taste." The degree to which there have been significant differences in the empirical results as a function of the sophistication of the econometric techniques, as well as the size of the database, is addressed along with an assessment of whether econometric demand estimation in general (Part 3) has provided greater insight into the determinants of attendance patterns compared to the more descriptive evidence from participation or audience surveys (Part 2), which ironically often serve as raw data for the econometric studies.

2. What Do We Know About Arts Audiences?

2.1 Common vs. Unique Findings Across the Performing Arts: The Early Literature

Two of the earliest empirical observations in arts economics are that (1) performing arts audiences are elite in terms of income, education and profession, and hence nonrepresentative of the more general population; and (2) there are only trivial differences in those audience characteristics across the various performing arts forms (Baumol and Bowen, 1966; Ford Foundation, 1974; Book and Globerman, 1975; National Research Center of the Arts, 1976; Throsby and Withers, 1979). In fact, that "audiences from art form to art form are *very* similar" was viewed by Baumol and Bowen as "the most remarkable finding" of their path-breaking efforts

to assemble credible data on arts consumption patterns, primarily in the United States (1966, p. 84). This overall finding was confirmed by the Ford Foundation's extensive twelve U.S. city survey of theater, symphony, opera and ballet, where it found "striking confirmation that the people who attend are indeed disproportionately well-to-do and well-educated" (1974, Vol. II, p. 13). Throsby and Withers (1979), evaluating 1976 Australian data, found essential similarity between Australian and American audiences, and cited British and Canadian data yielding similar results. A more recent Canadian survey of theater patrons in Montreal found ongoing evidence of this elitism in that 54 percent were university graduates, 45 percent earned more than $40,000 per year, and only 11 percent were employed in primary (manufacturing or construction) industries (Colbert et al., 1998).

While the prominence in the early arts economics literature of the Baumol and Bowen (1966), and Ford Foundation (1974) studies, reinforced by the thorough DiMaggio and Useem (1978) evaluation of alternative data from the National Research Center of the Arts (1976), tended to focus attention on United States data, the substantial elaborations by Throsby and Withers (1979) were especially influential in confirming that this general finding of an "arts elite" was not restricted to one country.[6] Actually, the commonality of arts consumption patterns across many different countries, educational systems and cultures was not a universally anticipated result, as Baumol and Bowen discovered when they were told by British colleagues to anticipate much more egalitarian results in extending their survey to Great Britain, due to the greater emphasis on the humanities in the educational system of that country (Baumol and Bowen, 1966, p. 89). However, except for a slightly higher representation of lower middle income groups in British audiences (p.93), Baumol and Bowen found "remarkable" similarity in the British and American results (p.89).

The Baumol and Bowen and Ford Foundation results were not based on econometric estimation (with its frequent but hardly exclusive focus on the derivation of various demand elasticities). However, a combination of descriptive, and non-regression and regression-based statistical analysis has generally confirmed the significant role of more advanced education (or arts training), and to a lesser extent confirmed (but not universally) the significant roles of high income and higher status professional employment in overall performing arts demand in a wide-variety of international settings. In addition to Throsby and Withers (1979) for Australia, and Book and Globerman (1975) for Canada, examples over many years that are not limited to the study of only one art form include: Australia (Throsby and Withers, 1985); Canada (West, 1985; Colbert and Nantel, 1989); United Kingdom (Gapinski, 1986; 1988); Spain (Prieto-Rodríguez and Fernández-

[6] The importance of the early U.S. data is confirmed by the fact that even Throsby and Withers (1979), making a serious effort to incorporate Australian and other country data, extensively incorporate the Ford Foundation and Baumol and Bowen data into their illustrations and analysis. Econometric analysis from 1966 to 2005 has been only a bit more balanced, with one-half of such studies using U.S. databases (22 of 44 studies). While one-half of such studies are not based on American data, the next highest single country representation is the U.K. at about 14 percent, and eight other countries are represented by as few as one or at most three such studies (Spain).

Blanco, 2000; Lopéz-Sintas and García-Álvarez, 2002); the Netherlands (Goudriaan and de Kam, 1983; Bakker, 1986; Ganzeboom, 1989); Switzerland (Abbé-Decarroux and Grin, 1992); Japan (Kurabayashi and Ito, 1992); Italy (Bonato et al., 1990); Sweden (Gouiedo, 1989); Germany (Pommerehene and Kirchgassner, 1987; Krebs and Pommerehne, 1995; Kirchberg, 1999); Ireland (O'Hagan, 1996); and Norway and Denmark (Svendson, 1992). Other studies that focus primarily on one individual art form such as theater or symphony orchestras (or on individual arts organizations), also tend to confirm the central role of these three socioeconomic variables in any study of arts demand (see Part 3).

However, it would be misleading to conclude that such findings generate consensus about the determinants of arts audiences and arts demand. Not only do income, education, and occupation have quite complex effects on arts audience composition and more technically on arts demand, but (1) the role of age is frequently different and less stable over time than expected (and would over some periods surprise the readers of *La Scena Musicale*), (2) the importance of prices (for the product itself as well as for substitutes and complements) has become more a source of disagreement than consensus, and (3) other factors such as perceived performance quality and a rich array of demographic and life-style characteristics have often outweighed income and occupation, and sometimes even education.

In fact, the original Baumol and Bowen (1966) conclusion that arts audiences are relatively elite and non-representative of the general population was even attacked by Cwi (1985) as fostering a "welfare economics mentality toward arts policy" that primarily serves the interests of artistic directors in supporting a kind of political agenda to justify government subsidies in order to bring the professional arts "to the people" (Cwi, p. 32, referring to a particular passage in Baumol and Bowen, 1966, p. 97). This is also the context for the periodic debate (see 2.3 below) regarding the existence of an arts boom in the United States (Baumol and Baumol, 1980, 1984; Heilbrun, 1984; 1993, 1996). Cwi (1985) argues that even if the basic Baumol and Bowen audience profile were to remain relatively constant, substantial societal changes in education and occupational choice would progressively make that profile more reflective of the general population (and hence less elitist), and that the elitism of arts audiences was always in part the result of an overly narrow definition of the arts (e.g. often omitting community theater and other more widely consumed art forms), as well as the inevitable consequence of a lack of arts marketing imagination.[7]

How strong is the evidence of performing arts elitism and audience uniformity? Regarding elitism, Table 1 replicates the original key findings in an especially revealing table from Baumol and Bowen (1966, Appendix Table IV-D, derived from the Twentieth Century Fund audience survey). The table entries represent "relative frequencies" defined as the ratio of the

[7]Of course, coherency in arts research has been hindered by both overly broad as well as overly narrow definitions of its subject. Broad definitions that include listeners to recorded music, various arts and crafts hobbyists, and internet surfers can generate "accurate" but relatively unhelpful claims that 96 percent of Americans are engaged in some aspect of the arts (see e.g., Cherbo and Wyszomirski, 2000, p. 6).

percent of particular arts audience characteristics to the percent of such characteristics in the total urban population. It is thus a direct measure of the degree to which certain types of characteristics are over or under-represented in both American and British performing arts audiences in the mid-1960's relative to their composition of the total population. This widely disseminated early evidence was influential in establishing the enduring perception of the strength of the elitism hypothesis. Table entries above 1.0 indicate an "over-representation" of the characteristic in performing arts audiences relative to the general population.

It is again important to emphasize that the concept of relative frequency used in Table 1 reflects the ratio of the percent in the audience to the percent in the total urban population. Furthermore, the audience survey from which the attendance data are derived does not capture the absolute frequency of attendance, i.e. the number of times (per year or per month) a member of the audience from any particular demographic group is in attendance. Thus, as discussed below, the importance of any demographic group to the performing arts will be understated if that group attends performances an unusually high number of times per time period, and will be overstated if that absolute frequency of attendance is unusually low (say, only one time per year). Despite that limitation, the relative frequencies cited in Table 1 do provide useful measures of the degree to which a demographic group is "over" or "under" exposed to the arts relative to its size in the total population.

Table 1
Relative Frequencies of Performing Arts Audience Characteristics
Relative Frequency = Ratio of Percent in Audience to Percent in Urban Population
(Income Ranges are for the mid-1960's)

Characteristic	U.S.	Great Britain	Great Britain equivalents
Age under 20	0.19	0.36	
20-24	2.00	3.46	
25-34	1.75	2.00	
35-44	1.66	1.24	
45-59	1.55	0.93	
60 and over	0.69	0.32	
Prof.-Technical Male/Female	4.96 / 4.51	8.07 / 5.65	
Managerial Male / Female	1.70 / 1.85	1.75 / 1.26	
Clerical and Sales Male/Female	0.76 / 0.53*	1.25 / 0.76 *	
Blue Collar Male / Female	0.05 / 0.05	0.07 / 0.06	
< 4 Yrs. H. School Male/Female	0.04 / 0.05	0.12 / 0.06	School leaving 14 or less
4 Yrs High School Male/Female	0.29 / 0.53	0.34 / 0.31	Age 15

1-3 Years College Male/Female	1.31 / 2.48	1.45 / 1.74	Age 16
4 Years College Male/Female	3.73 / 5.93	4.07 / 4.71	Ages 17, 18 or 19
Graduate School Male/Female	10.45/15.80	13.11/15.67	Age 20 or over
< $3,000 Family Income	0.18	0.18	< £ 500 Family Income
$3,000 to $4,999	0.30	0.55	£500 to £800
$5,000 to $6,999	0.45	0.74	£900 to £1,199
$7,000 to $9,999	0.74	1.02	£1,200 to £1,749
$10,000 to $14,999	1.96	1.91	£1,750 to £2,499
Over $15,000 Family Income	7.30	5.84	£2,500 and Over

Adapted from Baumol and Bowen (1966) with the data derived from the Twentieth Century Fund audience survey, Appendix Table IV-D. * indicates an averaging of the separately reported clerical and sales categories for females only in the original Table IV-D.

The only surprises regarding income, education and occupation in these data are the striking similarities between the American and British results, which actually show somewhat greater male occupational and educational arts elitism in Britain, and at least very similar patterns of female high education and high family income over-representation in the two countries.[8]

[8] However, Baumol and Bowen observe that it is primarily an "arithmetic weighting" phenomenon rather than any substantive economic difference that seems to account for the slightly higher British relative frequencies in all categories of male education. Regarding overall gender differences, while not as evident in the occupational results, the higher relative frequency rates of females across the different educational levels in the United States (and for the higher educational levels in Britain.) is consistent with more recent differential gender results favoring females (e.g. Bihagen and Katz-Gerro, 2000, for Sweden) as well as evidence that female spouses play a much more significant role in affecting male arts participation behavior than the reverse (Upright, 2004).

Although applicable to the mid-1970`s rather than the mid-1960`s, Throsby and Withers (1979, Table 7.4) reported similar results for Australia, while also stressing that specific demographic variables are much more closely linked to frequency of attendance than to data that document arts "exposure" or the mere act of attending at least one arts event over some time period (p. 99).[9] For their lowest income category, a relative attendance frequency of 1.49 can be calculated from their reported data, which increases to 2.2 for the intermediate range, and to 8.4 for their highest income range. Regarding education, their implied relative frequencies range from 0.057 for primary, to 0.546 for secondary, and to 7.10 for the tertiary education level. However, despite such similarities, their Australian data did suggest a few small international differences: (1) the role of education appeared to be somewhat stronger in the United States compared to Australia; (2) Australian attendance at theater and dance events was somewhat higher than in the U.S., Canada and the United Kingdom; but (3) Australians attended serious music events somewhat less than did those from the other countries.[10]

Age represents the most unexpected result in Table 1, with those aged 20-24 the most over-represented in both American and British arts audience relative to the size of that age group in the general population. The relative frequencies decline systematically with age, indicating that performing arts audiences were dramatically younger than the general urban populations in both countries in the mid-1960's. Section 2.3 addresses the degree to which audience characteristics like income and education have remained largely stable over time, while the American age relative frequencies have indeed changed toward older audiences. However, as seen in the Japanese and German data reported below in Tables 4 and 5, the age composition of performing arts audiences remained surprisingly complex into the early 1980's and mid-1990's, at least in those countries.

While Baumol and Bowen (p.79) provided both pessimistic explanations (arts audiences have always been more enthusiastic when they were younger, but "drop out" with age) as well as optimistic explanations (the young have recently discovered the arts and will now provide a firm foundation for future growth) for this youth bias in the early relative frequency data, alternative statistics can explain why arts audiences have often been thought to be relatively older. If one shifts attention from relative frequency data to a simple "percentage of arts audiences" measure, the importance of older audiences is re-established, especially for orchestras and opera when the absolute frequency of attendance is measured. For example, Baumol and Bowen report (1966,

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[9] They also combine two different tables from the Ford Foundation (1974, Vol II) study to generate mid-1970`s comparative data for the United States that could also be used to calculate relative frequency data similar to that reported in Table 1. Those mid-1970`s U.S. relative frequencies are consistent with the results for the mid-1960's reported in Table 1. Additional Ford Foundation results are reported in detail below.

[10] The most cited early data regarding Canadian audiences was provided by Book and Globerman (1975), whose findings also generally confirm the results in Table 1. West (1985) provided arts audience survey data for Ontario (for 1984-85), along with general public telephone survey results that allow the calculation of relative frequencies for educational levels (his Table 19, p. 82): 0.18 for under 4 years of high school; 0.74 for high school; 0.44 for community college (surprisingly lower than high school); 1.78 for university and 4.5 for graduate school.

Appendix Table IV-G) that for all sampled New York City performing arts organizations, 8.5 percent of the audiences were over 60 years of age while 7.7 percent were under 20. Furthermore, this older age "gap" is 8.6 percent vs. 7.8 percent for Off-Broadway, 16.3 percent vs. 9.6 percent for Orchestra, 10.1 percent vs. 6.6 percent for Opera, with only Ballet having a higher percentage of the youngest (8.9 percent) to the oldest (7.0 percent) represented in the audience. When frequency of annual attendance is considered, the reliance of arts organizations on older audiences becomes more pronounced. For those attending more than 10 times per year, 7.1 percent were over 60 years old compared to 2.4 percent under age 20 for Broadway Theater, with the "older age gap" a very high 17.9 percent vs. 3.9 percent for Major Orchestras, and a more moderate 7.0 percent to 5.8 percent for Regional Theater (Baumol and Bowen, 1966, Appendix Table IV-I).

This disparity in the age evidence between measuring arts audience characteristics relative to the general population versus measuring them relative to the total arts audience is a key distinction between population participation surveys and audience surveys, and is also evident regarding income and education, as revealed in data reported by the Ford Foundation (1974).[11] Table 2 combines data from the Ford Foundation study (Vol. II) Tables 14 and 14A (pp. 13-14) to reveal a seemingly less elitist picture when total performing arts audiences are decomposed by income range and educational achievement.

Table 2
Income and Educational Composition of Arts Audiences
United States: 1971

Characteristic	Theater %	Symphony %	Opera %	Ballet %
$0- $7,500 income	13	12	15	20
$7,500 - $15,000	40	37	34	32
$15,000 - $25,000	33	34	32	30
$25,000 and over	14	17	19	18
Some High School	18	21	20	18
High School Grad	26	18	18	16
Some College	23	24	24	26
College Grad	33	37	38	40

Source: The Ford Foundation (1974,Vol II), Tables 14 and 14A.

Comparing Tables 1 and 2 reveals that, despite the highest income groupings being dramatically over-represented in arts audiences compared to the general population (over 7 times

[11] Audience surveys are typically based on distributing questionnaires to performing arts, museum or exhibit audiences and collecting them upon departure, while participation surveys are designed to randomly sample the broader population, not limited to those who have been "self-selected" as part of an arts audience.

the general population in the United States and almost 6 times in Great Britain in Table 1), neither of the two highest income classes in Table 2 dominate the overall audience for any of the four performing arts types. Defining income similarly to that in Table 1 as "greater than $15,000" (in 1971 dollars) enhances the comparability of the tables, but still yields the surprising result that higher income attendees represent a bare majority (51 percent) of the audience for both symphony and opera, but are slightly outweighed by the two lowest income groups for both the theater (53 percent) and ballet (52 percent).

Of course, it is the much smaller overall size of the income elites in the general population that explains in part the weaker high income audience results in Table 2. For that reason, the comparable education results are especially striking, since the educational elites are also a relatively small group. While only about 11 percent of the U.S. population in 1971 had a college degree[12], they represented from between 33 percent (theater) to 40 percent (ballet) of the performing arts audiences. In fact, in contrast to the income results, those with at least "some college" education constituted over 60 percent of the audience for symphony, opera, and ballet performances, and 56 percent of theater audiences.

Despite this noteworthy difference in the high income relative to the high education composition of arts audiences, the data in Table 2 do confirm the broad similarity of the audience composition across all four art forms when only income and education are considered. For example, the difference across the four art forms between the highest and lowest percentage figures in Table 2 for any one income and educational classification is never greater than 10 percent (high school graduates made up 26 percent of theater, but only 16 percent of ballet audiences), and is 5 percent or less for four of the eight classifications (the two highest income ranges, and the lowest and second highest educational levels). There is very modest evidence that the theater and ballet were less elitist in 1971 in the United States (e.g. those two art forms had a slight majority of relatively lower income audiences, and the relatively less educated made up 44 percent of theater audiences), although the gap between high education and low education audiences was actually greatest for ballet in Table 2.

Kurabayashi and Ito (1992) provide evidence regarding the demographic composition of Japanese audiences for western classical music that is largely consistent with the results from the English speaking countries described above, but with some interesting twists. In Table 3, the results of two of their tables (Tables 5 and 6) are combined to show the occupational and income composition of audiences for the NHK Symphony Orchestra (NHK, for 1981), the Tokyo Philharmonic Symphony Orchestra (TPO, for 1983), and the Tokyo Symphony Orchestra (TSO, for 1983). Occupations include professionals (designated in Table 3 as Prof), clerical workers (Cler), managerial workers (Mang), the self-employed (S-E), students (Stud), and housewives (HW), while incomes are reported per month (in 1,000 yen).

Table 3
Symphony Audience Composition in Japan: 1981, 1983

[12] Derived from historical data on educational attainment (Tables 264 and 265) in the *Statistical Abstract of the United States, 1999.*

(Entries = Percentage of the total audience)

	Prof	Cler	Mang	S-E	Stud	HW	<150	150-199.9	200-249.9	250-299.9	300 +
NHK	28.0	15.7	16.4	5.3	14.7	12.2	14.0	13.6	13.7	9.9	48.9
TPO	25.0	16.5	14.2	3.4	22.5	8.2	16.9	20.6	16.1	8.2	38.2
TSO	20.4	18.3	8.4	6.3	31.6	4.9	22.3	17.4	16.1	9.5	34.8
Pop	5.8	11.8	3.5		13.3	26.9					

Source: Kurabayashi and Ito, Tables 5 and 6 (1992), citing original source documents as audience data files generated by surveys conducted by the File and Statistics Bureau of the Prime Minister`s Office. "Pop" (population) is a renaming of the authors' "KMMA (1980)," or the percentage of that demographic group in the Keihin Major Metropolitan Area, which includes Tokyo, Yokohama and Kawasaki, encompassing 70% of orchestra audiences. No entry is provided for self-employed, since that figure is included in the professional classification. Comparable percentages are not provided for the income ranges, hence those cells are empty for the income classifications. While the income percentages sum to 100 since they are all inclusive, those for occupations do not, since the original source tables do not include all occupational types.

The occupational results are relatively predictable, but as with Table 2, they are not fully consistent with the "arts as elitist" hypothesis, depending on the interpretation. For example, highly educated professionals combine with students to provide only from 42.7 percent (NHK) to slightly over 50 percent (TSO) of these western symphony music audiences (although it is noteworthy that students are least attracted, and professionals are most attracted, to the "establishment" NHK Symphony Orchestra). Kurabayashi and Ito define the elites as professionals, managers, and the self-employed, and make the similar point about arts elitism that "their share of the audience for the Tokyo Symphony barely amounts to 35 percent," also noting that the combined audience share for these groups is also below 50 percent for the Tokyo Philharmonic (p.280).[13] Yet, as also reflected in English language audiences, these elite groups are indeed over-represented relative to their base size in the metropolitan area (similar to relative frequency data), which leads the authors to conclude that audiences for these Japanese orchestras "belong to the occupations which constitute the highest social stratum" (1992, p. 281). Thus, by that alternative standard, arts elitism is again revealed.

While the authors do not speculate on this point, one might interpret the relatively strong results for clerical compared to managerial workers (with only a slightly lower composition of clerical workers in NHK audiences, and higher clerical composition for both the TPO and especially the TSO) as suggesting that income alone is not as important as education (or more

[13] They also report similar results for local audiences for the Sapporo Symphony and the Osaka Philharmonic Orchestra (1992, Tables 8 and 9). In general, Kurabayashi and Ito exhibit somewhat more interest in the comparisons across the different orchestras than in the more general average results regarding the demographic composition of Japanese audiences.

pointedly, arts related education) in determining the composition of arts audiences. That is, managerial incomes will exceed clerical incomes (although probably by a smaller factor than in western economies) without generating higher representation for managers in such audiences. But since managers (compared to professionals or students during their school years) are likely to have more career-oriented training rather than more broadly based education complementary to arts appreciation (except in their earliest years of education), their higher incomes may not translate into strong arts appreciation and effective demands for the higher arts.

The audience composition results based on income in Table 3 are interpreted by Kurabayashi and Ito as fully consistent with the occupational data (p. 281). However, there are enigmas in these results that beg clarification: (1) the relative size of the very highest income group in Japanese concert audiences is dramatically higher than those reported in Table 2 for the United States, and (2) there is a fascinating, and unexplained, significant drop for each orchestra in the second highest Japanese income group representation relative to every one of the lower income groupings (a result seen only very modestly for American audiences in Table 2, and only regarding the second and third income classification, although it does apply across all four art forms).

The Japanese results regarding age are also of interest in light of the unexpectedly complex role that age played in the discussion of American and British audiences from the earlier data, although the context of analyzing Japanese audiences regarding western classical music may significantly influence the comparability of such results with western audiences. Nevertheless, Table 4 documents the surprising results regarding the age composition of Japanese audiences for western classical music (a combination of several tables in Kurabayashi and Ito, 1992).

With the sole exception of a notable trend toward older audiences for the NHK between 1977 and 1981, these results indicate a remarkable bias toward younger audiences, especially for the Osaka Philharmonic, where fully 68.9 percent of females in the audience were younger than 30. In

Table 4
Age Composition of Japanese Audiences for Symphonic Music
By Gender and Specific Orchestra (1977, 1981, 1983)
(Entries = Percentage of Males and Females by Age)

	NHK '77		NHK `81		TPO '83		TSO '83		SSO '81		OPO '83	
Age	M	F	M	F	M	F	M	F	M	F	M	F
<30	42.1	48.3	30.3	35.2	43.7	55.0	53.3	68.1	39.8	50.7	50.8	68.9
40+	36.4	33.2	50.7	49.7	35.9	31.8	28.2	20.1	36.3	26.2	29.2	17.4

Source: Kurabayashi and Ito (1992), Tables 3, 4, and 7. Audience percentage compositions apply to subscription concerts. Note that the sum of any one column provides the total of either males or females who were either younger than 30 or 40 and older. Summing the rows for any orchestra is meaningless (and hence is not restricted to be 100 or less). NHK: NHK Symphony Orchestra; TPO: Tokyo Philharmonic Symphony Orchestra; TSO: Tokyo Symphony Orchestra; SSO: Sapporo Symphony Orchestra; OPO: Osaka Philharmonic Orchestra

fact, more than 50 percent of each gender was younger than 30 for all non-NHK cases except for males attending the Tokyo Philharmonic and the Sapporo Symphony, and even in those cases the young group outweighed the older group. Of course, as noted above, there is a dramatic difference in the cultural context of these results, with western music (even of the classical type) potentially representing a more experimental and "modern" art form in contrast to native Japanese folk songs, enka, rokyoku and other indigenous music, labeled "Japanese popular melodies" by Kurabayashi and Ito (p. 276). However, this phenomenon should not be overstated, inasmuch as the authors also observe that "the tastes of the Japanese people for Western classical music are fairly firmly established." Also, the correlation results across various types of music reported by Kurabayashi and Ito (their Table 2) indicate that there is notably higher correlation between western classical and Japanese popular music than there is between Japanese popular music and either traditional western music (such as jazz, swing, Dixieland and French popular songs), or modern western music forms (such as rock and roll, rhythm and blues, soul, discotheque, or techno-pop).[14] In any case, the fact that the older audience designation in Table 4 is still relatively young (starting at only age 40), and the consistency across all orchestras (4 of 5) of the result of young audience dominance in the early 1980`s again reflects the often surprising role of age in performing arts audiences.

Would anything approximating this youth bias be found in the heart of western classical music such as Germany, where classical music is typically referred to as *ernste* or "E-Musik", in contrast to less culturally "rich" popular or "U-Musik?" Wiesand (1995) provides evidence of notable differences in the propensity of different age groups to consume four different types of concerts, but except for the strong youth bias for rock/jazz music, his findings show relatively similar consumption patterns among the youngest age group (18-24) across the three other music types. The next youngest group (25-34) shows more variation, but has the highest propensity to experience "E-Konzerte." The results in Table 5 are adapted from his fifth visual exhibit (a bar graph).

Table 5
German Music Consumption Patterns: 1994
(Entries = Percent of age group attending a particular type of concert)

Music / Age	18-24	25-34	35-49	50-64	65+	Row total
Music Theater	30	34	36	33	29	162
"E" Concerts	25	28	26	20	17	116
"U" Concerts	28	19	34	34	33	148

[14] They also observe, inconsistent with the section 2.2 evidence of "audience overlap" in American and Australian audiences, that "surprisingly..., opera attracts less interest among audiences for classical music" (p. 279).

Rock/Jazz	59	42	23	7	4	135
Column Total	142	123	119	94	83	

Source: Ubersicht 5: Konzerte und Musiktheater - Besucheranteile in den verschiedenen Altergruppen 1994 (in %), from Wiesand (1995) . Figures are approximations from the original bar graph entries. Note that since people in any age group can attend from zero to multiple types of concerts per year, neither rows nor columns are defined to sum to 100. However the column total reflects the overall propensity of an age group to attend music events, while the row total is an indication of the general popularity of a particular type of music. (The column and row totals are not in the original).

The evidence from Table 5 confirms the expected result that the youngest German age group has the highest overall participation rate in attending concerts (i.e. the highest column total), with overall participation declining consistently with age. The row totals also confirm that the most "high-brow" music (E-concerts) is the least popular, suggesting that even in a country with a well-developed classical music tradition, audience development is still a challenge. The youngest group (18-24) is also notable for having relatively similar participation rates for all three non-Rock and Jazz music types (although lowest for the classical type E-music). The most significant result is that the second youngest age group (25-34) has the highest classical music participation rate, and the combined participation rates of the youngest groups (younger than 35) are higher than the comparable rates for the two oldest age groups (older than 50). Thus, the German evidence is also consistent with the earlier results that, at least when frequency of attendance is ignored, the performing arts should not automatically be thought of as dominated by older age groups.[15] It is likely, however, that more detailed evidence regarding the frequency of attendance would modify this result in both the Japanese and the German data, as it did regarding the analysis of the American age composition of arts audiences.

Further evidence regarding both the degree of social class elitism and its similarity across art form audiences, as well as additional suggestive evidence regarding the relative roles of education versus income, was provided by a 1975 national cross-sectional survey conducted in the United States by the National Research Center of the Arts (1976). That survey (as noted above) formed a key part of the DiMaggio and Useem analysis of social class and arts consumption (1978). Table 6 is adapted from the DiMaggio and Useem compilation of some of those survey results (their Table 1), stressing the so-called education gap and the income gap in the self-reported "exposure" of various types of individuals to seven different "cultural forms" (exposure is defined as the percentage of the group who consumed any amount of the art form during the previous twelve month period). For example, an education gap of 58 (percent) is reported for exposure to art

[15] This point is also consistent with the West (1985) Ontario, Canada audience survey finding that the same percentage of arts audience (20.1 percent) were 20-30 years old as were 40-50 years old, and those older than 50 constituted only a trivially higher 20.9 percent of audiences. The dominant age group was 30-40 (29.6 percent). He did confirm, however, the frequent finding that the under 20 age group was dramatically under-represented at only 2.6 percent of Ontario audiences in 1984-85.

museums because the exposure rate of the most educated group (college graduates) was 78 percent while the exposure rate for the least educated group (< high school graduate) was only 20 percent (an absolute difference of 58 percent). Each "consumption gap" entry in Table 6 reflects this absolute difference between the exposure rates of the most versus least educated, or the highest versus lowest income group.[16] In each case, the table also reports the relevant absolute exposure rates.

There are four main messages contained in Table 6 related to American cultural exposure in the mid-1970s. Firstly, there was a sizeable education gap for all seven cultural forms, even including popular music, but clearly greatest for the three high arts forms (surprisingly highest for art museums, which at different times and using somewhat different measures has been less elitist than other art forms). Secondly, the income gap displays the unexpected pattern of being

Table 6
Exposure Rates and Consumption Gaps for Seven Cultural Forms: United States 1975
(Entries = percent of the relevant population exposed to that art form in last twelve months)

Category	Art Museum	Theater	Classical Music	Science Museum	Book Reading	Cinema	Popular Music
< High School	20	18	23	17	26	56	25
College Grad	78	73	77	59	60	85	40
Education Gap: High - Low	58	55	47	42	34	29	15
<$5,000	20	17	9	12	29	46	21
>$15,000	59	57	27	45	49	82	45
Income Gap: High - Low	39	40	18	33	20	36	24
Education Gap - Income Gap	19	15	29	9	14	- 7	- 9

Source: Adapted from DiMaggio and Useem (1978), Table 1; derived from National Research Center of the Arts data (1976). (Note: "Education Gap - Income Gap" is not in the original).

lowest for arguably the most elitist art form (classical music), and almost as high for the more popularized cinema as it is for art museums and theaters. Thirdly, this "perverse" behavior of the income gap cannot merely be explained by noting that classical music has by far the smallest over-all exposure by income while cinema has the highest over-all exposure; classical music revealed lower overall education exposure rates compared to cinema without reversing the expected

[16] The three educational categories are < high school graduate; <college graduate; college graduate, and the four income categories for the mid-1970's are <$5,000; $5,000-$10,000; $10,000-$15,000; >$15,000).

education gap ranking. Fourthly, the education gap is notably larger than the income gap for all but two of the most popularized cultural forms, for which that gap is actually negative (cinema and popular music), and is predicably highest for the form likely to make the greatest intellectual demands on an audience, classical music. Therefore, at least regarding education, Table 6 reveals largely expected results regarding both the relative elitism of arts audiences and their similarity across art forms, but provides some enigmatic results regarding the relationship between income and arts consumption.

While the positive causal relationship between education and income has plagued econometric efforts to separate their independent effects, the early non-econometric literature was replete with suggestive evidence such as in Table 6, and the Ford Foundation study (1974, Vol. II) that the role of education was much stronger than that of income.[17] In fact, one of the very few

[17] Globerman (1989) also cites other U.S. data from the Association of College University and Community Arts Administrators, Inc. (1984-1985) as providing at least "suggestive" evidence that education is more important than income and occupation in determining arts attendance. An early effort to explicitly link education to productive efficiency in the consumption of arts activities was Globerman and Book (1977). Lévy-Garboua and Montmarquette (1996) cite Globerman and Book (1977), but only for their estimation of Engel curves in that paper, especially related to theater.

books intended to be a text in arts economics (Heilbrun and Gray, 2001) identifies the Ford Foundation study as important evidence of the relative effects of education versus income (after a brief discussion of the statistical multicollinearity problem (pp. 49-50)). They do, however, also cite Gray (1998b) as providing multivariate regression evidence supportive of a larger role for education than income, based on an analysis of 1997 National Endowment for the Arts (NEA) SPPA data (Surveys of Public Participation in the Arts) which was submitted as a report to the NEA (tables A17, A20 and A21).[18]

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[18] Researchers who are selectively familiar with only the econometric literature seem especially prone to concluding that there is no coherent evidence of the separate roles played by these two strongly positively correlated variables. For example, papers submitted for publication and reviewed by the author that do not cite any of the earlier more descriptive literature on this issue, commonly draw this overly pessimistic conclusion. This conclusion has no doubt been reinforced by the fact that two of the best early econometric studies that did indeed confirm a relatively weak role for income, did not include education as a separate independent variable in their equations (Moore, 1966; Withers,1980; with additional results also reported in Throsby and Withers, 1979), and the fact that an early study that did include both independent variables (Gruenberg, 1975; see text below) was unpublished. Furthermore, similar to the case with Gray (1998b), two other studies documenting some econometric support for the strength of education over income are relatively unknown (Goudriaan and de Kam, 1983; Ganzeboom, 1989). Gapinksi`s (1981) attempt (in a very short paper of 4 pages) to separate those effects, seems to have become confused in the literature with his related work on costs of production using transcendental production functions (Gapinski,1980, which does not include any demand modeling, although

Gapinski, 1984, estimates both production and demand functions), or has been lost as an early non-reprinted *Journal of Cultural Economics* publication, as is also likely with Globerman and Book (1977).

The later National Endowment for the Arts 2002 SPPA survey (NEA 2004) continued to report that education, "more than any other demographic factor" is highly correlated with attendance at arts events and museums (p. 19). However, of more relevance to the issue of whether regression analysis has confirmed this result, is the NEA sponsored study by Peterson, et al. (2000), which generally (but not universally) reports that education is the strongest predictor of arts attendance using data from the 1997 SPPA survey and basic OLS estimation. The results of this American based study (not estimating well-defined demand functions), which is not published in any academic journal and is already out-of-print, do not appear to be widely known outside of the United States (consistent with the observations made in fn. 18).

It is noteworthy that DiMaggio and Useem (1978), despite the evidence they evaluated linked to Table 6 above, were reluctant to conclude that education was the dominant determinant of performing arts attendance without also citing the Ford Foundation evidence. They also cite an early unpublished multiple regression analysis using national U.S. cross-sectional data for 1964-65 (Gruenberg, 1975) to support the relative power of education compared to income or occupation in explaining the "tendency to devote leisure time to attending concerts, plays, museums, and fairs" (DiMaggio and Useem, 1978, p. 148). Finally, they especially emphasize the "anomalous pattern" in the consumption rate of teachers, which consistently revealed higher arts exposure rates than managers and other professionals "of higher class position," again strongly suggesting the more fundamental role of education as a "more salient determinant of arts consumption than other social-class dimensions" (DiMaggio and Useem, 1978, p. 147).

Table 7 documents the important evidence from the Ford Foundation study that led it and others to conclude that "to a startling degree...it is indeed education rather than income that matters most" (Ford Foundation, 1974, II, p. 16). The powerful message of Table 7 is contained in the cells labeled "difference: education" and "difference: income." Using theater attendance as an example, when income is held constant at either a high or low level, differences in education generate either a 21 percent differential in attendance rates (for high income), or a 25 percent differential in attendance (for low income). However, when this is reversed, and education is held constant at either a high or a low level, differences in income have much smaller effects - an attendance rate differential of only 8 percent for those with high education, and a 12 percent differential for those with low education.

Table 7
Education versus Income:
Percentage Attending (20 Years Old and Over)

A. Theater	High Education	Low Education	Difference: Education
High Income	43% attending	21% attending	**22%** in attending
Low Income	35% attending	10% attending	**25%** in attending
Difference: Income	**8%** in attending	**11%** in attending	**Avg. Ed / In: 2.47**
B. Symphony			

High Income	28%	12%	**16%**
Low Income	24%	5%	**19%**
Difference: Income	**4%**	**7%**	**Avg. Ed / In: 3.18**
C. Opera			
High Income	12%	5%	**7%**
Low Income	10%	2%	**8%**
Difference: Income	**2%**	**3%**	**Avg. Ed / In: 3.00**
D. Ballet			
High Income	14%	4%	**10%**
Low Income	12%	2%	**10%**
Difference: Income	**2%**	**2%**	**Avg. Ed / In: 5.00**
E. Broadway Musicals			
High Income	46%	24%	**22%**
Low Income	32%	12%	**20%**
Difference: Income	**14%**	**12%**	**Avg. Ed / In: 1.62**
F. Jazz, Rock and Folk			
High Income	30%	28%	**2%**
Low Income	31%	17%	**14%**
Difference: Income	**- 1 %**	**11%**	**Avg. Ed / In: 1.60**
G. Movies			
High Income	82%	80%	**2%**
Low Income	80%	58%	**22%**
Difference: Income	**2%**	**22%**	**Avg. Ed / In: 1.00**

Source: Adapted from The Ford Foundation (1974, Vol. II), Table 15. (Note: "Avg. Ed /In" figures are not in the original).

Since the average educational attendance differential holding income constant is 23.5 percent, while the average income differential holding education constant is only 9.5 percent, the "Avg. Ed / In " score of 2.47 is derived for theater as the simple ratio of those averages. While the

construction of the Avg. Ed/In measure stretches the boundary of what these data can demonstrate, a suggestive interpretation might be that educational level variations are 2.47 times more potent in explaining theater attendance differences than are income variations. However, such a conclusion regarding relative explanatory power is more properly the domain of regression analysis, to the extent that those effects can indeed be separated (see part 3.2.2 below).

This stronger education effect is remarkably robust, even strengthening (as measured by this imprecise, but suggestive Avg. Ed/ In ratio) for performing art forms with lower overall attendance rates than theater, with a ratio of 3.18 for symphonic music, 3.0 for opera (with the lowest overall attendance rates) and a surprising 5.0 for ballet (with attendance rates only slightly higher than opera). While much weaker, this apparent relative potency of educational differences in affecting attendance rates even extends to popularized Broadway musicals, and the more contemporary music forms of jazz, rock and folk (both with ratios of about 1.60). By this measure, education only fails as the stronger factor compared to income in the case of movies, where their average "explanatory power" is equal. Despite legitimate reservations about the interpretation and robustness of the Avg. Ed/In ratio constructed in Table 7, this is an intuitively appealing result that is supportive of its usefulness.

It is noteworthy, as well as surprising, that despite the sophistication of some of the econometric techniques discussed below (section 3), these mid-1970's Ford Foundation results, along with the National Research for the Arts survey data on exposure to the arts during the same time period (see Table 6 above), continue to stand as perhaps the most compelling case for education as the dominant determinant of variations in performing arts attendance (as evidenced again by the Heilbrun and Gray, 2001, discussion of education vs. income on pp. 48-51).[19] This issue of how much of our understanding of arts demand has been improved by advances in analytical technical sophistication is an important theme that is addressed in the concluding section.

2.2. Segmentation Studies and Audience Overlap: The Co-Patronage Evidence

Despite the generally strong evidence for the original Baumol and Bowen (1966) conclusion that audience characteristics are very similar across all performing arts types, this is not to say that the same people constitute the primary audience for all art forms. In fact, the early evidence on arts

[19] Throsby (1994) also cited Baumol and Bowen (1966) and the Ford Foundation (1974, Vol. II) as early studies showing the importance of higher education, income and occupational status in determining arts audiences, but did not identify any stronger evidence for education. This is in contrast to the Throsby and Withers (1979) discussion (p. 101) of the "confirmed" evidence for the stronger role of education linked to the Ford Foundation (1974) findings of very high teacher arts attendance rates and the type of differential income vs. education effects documented above in Table 7. More tellingly regarding the influence of econometric evidence on this issue, while noting that subsequent time-series and cross-sectional demand studies were able to further clarify our understanding of arts demand, Throsby (1994) does not mention any econometric evidence directly comparing the relative roles of education vs. income, although citing Withers (1980) for being the best evidence of the role of the price of leisure in causing "unadjusted" income elasticities of demand to be surprisingly low.

cross-attendance or "co-patronage" patterns (often called audience "overlap") found notable evidence of limited audience overlap and a strong tendency for audiences to segment themselves in quite interesting ways. However, more recent evidence suggests that arts audience segmentation may be lessening, especially among younger consumers who appear much less concerned about the social status of quite differing forms of entertainment extending beyond the arts (e.g. Peterson, 1992).

Again, the Ford Foundation (1974, Vol. II) results set the early tone in finding that opera and ballet enthusiasts were especially dedicated to the arts in general, although opera attendees were particularly fond of symphonic music, while ballet-goers were partial to the theater (p. 11). But in addition to that perhaps predictable distinction, the Ford Foundation surprisingly found that over 33 percent of symphony concert attendees and over 50 percent of theater-goers never attended any other arts events (1974, Vol. II, p. 11).

Throsby and Withers (1979, pp. 101-102) elaborated upon this evidence using 1976 Australian population survey data regarding arts exposure to explore the likely degree of audience overlap across art forms. Since their Table 7.1 (p. 97) reported that 17 percent of the 14 year old and above population had attended a theater event at least once during the past year, with comparable figures of 9 percent for symphony, 6 percent for opera, and 10 percent for ballet, they identified the maximum overall population exposure to the arts as 42 percent, if each art form attracted an entirely unique audience. Conversely, full audience overlap would imply a total population exposure of only 17 percent. They then cite independent evidence for the relatively sophisticated city of Melbourne for a total population exposure of 34 percent (expected to be higher than for Australia as a whole, p. 102), and overall population exposures in the United States of 23 percent (linked again to the Ford Foundation, 1974). Their overall conclusion that the performing arts reach about 25 percent of the above age 14 population of those two countries would actually imply reasonably strong audience overlap for Australia inasmuch as their no overlap result was 42 percent exposure (17 percentage points higher than 25 percent), compared to 17 percent for full audience overlap (only 8 percentage points lower than 25 percent). Of course, they were essentially guessing at how much lower the overall Australian exposure rate would be compared to Melbourne`s 34 percent. A nationwide exposure rate of 30 percent, for example, would be roughly at the midpoint of their benchmark rates of 42 and 17 percent and would suggest much less Australian arts audience overlap.

The issue of the degree of audience overlap vs. segmentation, both within the performing arts and across other forms of entertainment (including the media arts) was also the focus of many other studies, including a flurry of marketing inspired audience segmentation and co-patronage studies typically applying factor or cluster analysis to U.S. data, especially in the late-1970's and early 1980`s. In part, these studies seemed motivated by an apparent gap in the arts audience literature, as reflected by the observation in Belk et al. (1980) that the DiMaggio et al. (1978) study of 270 audience studies since 1970 identified "only eight studies examining the co-patronage of various cultural forms" (p. 95). Hence, despite the general assumption by arts managers that they were all "drawing from a common pool of aficionados," there had actually been scant attention paid to verifying that proposition (Belk et al., 1980, p. 95; see also Cwi, 1987 and for an application to cinema audiences Cuadrado and Frasquet, 1999).

In fact, the co-patronage (audience overlap) issue has continued to be relatively ignored, even in the face of recent sociological studies dubbed the "culture of consumption research stream" (Fisher and Preece, 2003, p. 69, citing also van Eijck, 2000; see also Bryson, 1997; Fisher and Preece, 2002; López Sintas and García Álvarez, 2004). This research was stimulated by Peterson's (1992) introduction of the terms "omnivore" (one whose music and leisure consumption is so broad and eclectic as to defy being called elitist) and "univore" (by contrast, a person with decidedly narrower favorites among music and leisure options) to replace the standard concepts of elite (or high brow) versus mass (or low brow) as descriptors of cultural stratification.[20] While some of the related empirical findings are of indirect relevance to the issue of audience overlap, only Fisher and Preece (2002) generate results directly measuring the degree of audience overlap among the five major categories of the performing arts, finding a "significant degree" of overlap. A related example of the relative paucity of overlap evidence is the absence of even one table directly documenting such evidence in the 2002 *Survey of Public Participation in the Arts* (NEA, 2004). Nevertheless, somewhat mysteriously, the Chapter 8 summary of the 2002 SPPA results makes the following observations about American crossover audiences (pp. 55-58):

1. At least 50 percent of attenders at other arts events also visited an arts museum.
2. Opera has the most crossover with ballet, and those attending "other dance" are also more likely to attend ballet. Also, over 60 percent of opera attenders attended a musical.
3. "Adults attending a ballet or opera performance are much more likely to attend a classical music performance" (p. 56).
4. More than 40 percent of those attending opera or ballet also attend jazz performances, and there is also a relatively high crossover of classical music and jazz audiences.
5. Interestingly, only non-musical theater audiences were not identified as having any particular crossover "partners." Belk et al. (1980) had identified the hypothesis that theater audiences are somehow different from other arts audiences as a key motivation for their interest in examining audience overlaps.

[20] The biggest surprise to economists reading the notable contributions of sociologists to the arts participation/attendance literature may well be the inversion of causality that often motivates their analysis. Due to the influence of Bourdieu (1973) and his focus on the role of "cultural capital" in "class reproduction," most sociologists are especially interested in (1) cultural capital as a key independent variable (via numerous causal pathways) in the determination of educational and other measures of lifetime success, and (2) the adequacy and stability of participation in the high arts as a proxy for the more complex notion of cultural capital. Hence, instead of stressing the role of income and education as demand determinants of performing arts attendance, this reverse perspective would stress the role of performing arts attendance as a determinant (or a reflection) of the stock of cultural capital, and in turn the effect cultural capital has on increasing one's social status, including educational achievement and income. However, since one way to test the hypothesis that cultural capital is declining as a source of social status (or that the performing arts are becoming a less significant source of cultural capital) is to examine whether arts participation rates by, for example, the more educated or females (for whom such cultural capital seemed to be especially important) has shown particularly high rates of decline, the focus reverts back to viewing attendance as the dependent variable and educational level and gender as independent variables. See, e.g. DiMaggio and Mukhtar (2004).

These observations are broadly consistent with the Fisher and Preece (2002) conclusions using Canadian data (i.e. the 1998 Statistics Canada *Time Use Survey* of 10,749 adults) that (1) opera attenders are the most likely, while theater goers are the least likely, to attend other types of performing arts events; (2) symphony, choral music and dance audiences exhibit an intensity of co-patronage behavior that is less than that of opera fans, and more than that of theater-goers; and (3) those who most frequently attend one type of arts performance are a disproportionate share of those who most frequently attend other types of performances.

The earlier detailed co-patronage studies generally uncovered specific audience segments when studying attendance patterns at a variety of events (typically including the various performing arts, jazz or rock concerts, and different types of museums). For example, Sexton (1980) and Sexton and Britney (1980) found strong evidence for four segments, labeled as (1) "lights," with relatively low attendance at all events, and the largest group; (2) museum fans, from 19.5 percent to 21.4 percent across two different samples; (3) "all-rounders," who frequently attended most types of events, averaging about 14 percent in the samples; and (4) "specialists," who rarely attended any events beyond their special interest, ranging from 17.9 percent to 24.2 percent. The relatively small percentage of "all-rounders" in those particular studies would suggest that the generalized finding of great similarity of demographic characteristics across the various performing arts audiences does not necessarily mean that it is the same people who are populating those diverse arts venues. While not necessarily clarifying the magnitude of audience overlap in the arts, the enthusiasm of marketing researchers to differentiate arts audiences by various criteria continues, as exhibited by the Cuadrado and Mollá (2000) categorizations of "beginners, theater buffs, enthusiasts and indifferents" based on the importance Spanish theater-goers attach to the competing motives of "emotions, cultural fulfillment, interest and social hedonism."[21]

The theme of arts audience fragmentation was also the focus of Svendson (1992), although the data presented regarding Danish and Norwegian broadly defined cultural consumption patterns were more successful in documenting the relative unpopularity of the high arts compared to pop concerts, movies and even church events, rather than providing documentation on audience overlap or fragmentation. Furthermore, despite the Ford Foundation (1974) evidence cited above regarding the surprising lack of interest of significant portions of American orchestra fans (over 33 percent) and theater-goers (over 50 percent) in any other types of arts events, and the Sexton(1980) and Sexton and Britney (1980) results regarding specialists vs. all-rounders, Svendson cites the United States as being perhaps unique in having especially non-fragmented arts audiences which "tend to consume a wide variety of art products" (p. 86). Svendson contrasts any such audience non-fragmentation with sociological studies that allegedly show significant intolerance among fans of one art form toward other arts enthusiasts, being in fact "illiberal or intolerant towards other art loving groups, which are looked upon as inferiors or underdeveloped" (Svendson, 1992, p. 86).

[21] The "Market Research Section" in most issues of the *International Journal of Arts Management* is an especially rich source of information of this kind. For example, Bouder-Pailler (1999) provides evidence regarding the motives of French theater-goers reminiscent of Cuadrado and Mollá (2000).

These contradictory views of the degree of arts co-patronage have been common. Belk et al. (1980), after describing a number of arts segmentation studies between 1975 and 1980, concluded " "a clear answer to the question of whether attendance at various arts activities tends to cluster together and/or with other leisure activities does not emerge from past research" (p. 95). In an effort to remedy that problem, Belk et al. (1980) examined two American surveys of quite different populations, but which are highly comparable regarding the type of data collected: (1) an Opera America sponsored self-administered audience survey of 2,607 attenders of six major opera companies in all regions of the United States *except* the Southeast, and (2) a National Endowment for the Arts random telephone survey of 1,491 residents of four Southeastern U.S. cities who, among other screening devices, had attended three or more theater or symphony performances in the past. They not only identified more entertainingly labeled "life-style" groupings than the audience segments in Sexton (1980) and Sexton and Britney (1980),[22] but found (1) relatively strong evidence of co-patronage across art forms, especially among heavy attenders of individual art forms but even including theater patrons (who, as noted above, have often been thought less committed to the arts than other arts supporters), and (2) substantial co-patronage of movies, live sporting events and rock concerts among heavy attenders of the performing arts (p. 100). Table 8 reports these findings (from Belk et al. (1980, Table 3).

Table 8

Percent Overlap in Audiences: U.S. 1980
Percentage attending at least one time in last 12 months
(Left side entries: Theater & Symphony survey; Right side entries: Opera survey)

Column Definitions: Heavy attenders: **HA** Non-attenders: **NA**	Rock Concert % attending	Museums % attending	Ballet % attending	Theater % attending	Symphony % attending
Rock Concerts **HA**	-----	56 / 77	48 / 49	61 / 82	41 / 67
Rock Concerts **NA**	-----	38 / 71	42 / 46	36 / 70	7 / 61
Museums **HA**	46 / 10	-----	58 / 58	63 / 82	37 / 82
Museums **NA**	29 / 6	-----	35 / 30	33 / 59	7 / 42
Ballet **HA**	31 / 7	49 / 87	------	46 / 87	17 / 77
Ballet **NA**	34 / 8	36 / 63	------	34 / 60	7 / 50
Theater **HA**	52 / 9	69 / 83	62 / 59	------	43 / 70
Theater **NA**	28 / 6	33 / 50	34 / 27	------	7 / 45
Symphony **HA**	42 / 8	95 / 82	88 / 62	83 / 80	------

[22] These are identified as passive homebodies (20 percent), active sports enthusiasts (19 percent), inner-directed self-sufficients (14 percent), arts patrons (20 percent), active homebodies (13 percent), and active sociables (14 percent). From Belk et al. (1980, Table 2).

Symphony **NA**	37 / 8	49 / 57	49 / 30	38 / 58	------

Source: Belk et al., (1980), adapted from Table 3 (without the category "Light Attenders" in the column headings, defined as attending 1 or 2 events; there is also some reorientation of the table headings). "Heavy attenders" are defined as those attending 3 or more events in the previous 12 month period. Note that for comparability across the two samples, no opera results were reported in the original table, even for the sample of attenders of the six opera companies across the U.S.

An example of the interpretation of these results is that 88 percent of heavy symphony concert attenders (3 or more times in the last twelve months) in the theater and symphony survey (limited to four cities in the Southeastern United States), and 62 percent of those in the opera survey (over six companies throughout the U.S.) have also attended a ballet performance at least one time in that same time period. Thus, the first noteworthy result from Table 8 is that, while most of the entries are relatively similar between the two survey samples, there can be substantial differences, which are especially dramatic in the rock concert and the symphony columns. The authors suggest that while the patterns of co-patronage are similar across the two surveys, the levels can be sensitive to the composition of the samples, especially the fact that the opera sample consisted of people with especially low base attendance levels at rock concerts, and the relatively low overall base arts attendance levels of people in the Southeastern symphony and theater sample. They conclude that "base rates should be carefully examined in considering the absolute levels of co-patronage" (Belk, et al., 1980, p. 99).

Turning to the claimed similarity of patterns of co-patronage regardless of any variations in the absolute levels, the authors conclude that they have found substantial evidence of arts (excluding rock concerts) co-patronage and audience overlap, with the possible exception of ballet. That is, heavy attenders of museums, theater and symphony (and ballet) performances each have average co-patronage rates (i.e. attending at least once) that are notably higher for each other art form compared to the co-patronage rates of non-attenders. Their cautionary note about ballet is due to the low absolute level of co-patronage that is observed between heavy ballet attenders and symphony concerts in the theater and symphony sample (only 17 percent), along with the lower than 50 percent absolute co-patronage rates between heavy ballet and the other art forms in that same sample. Similarly, only 37 percent of heavy museum-goers attended at least one symphony concert in the Southeastern sample, but that low rate was not observed with other art forms. They also make special note of the lack of any compelling evidence for average lower arts co-patronage rates among theater and museum audiences compared to symphony and ballet audiences, a result expected by many who considered theater and museum patrons to be less dedicated to the arts in general.

How do these Table 8 results from 1980 compare to the five crossover audience observations made in the summary of the 2002 SPPA survey, and to the similar 1998 Canadian results (Fisher and Preece, 2002)? Despite some difficulties in making that comparison (e.g. the 2002 summary results do not distinguish heavy from other attenders, and Table 8 has no opera results), some conclusions can be drawn. The 2002 result that at least 50 percent of performing arts attenders also visited an arts museum is replicated in the results in both surveys from about twenty years earlier.[23] Of course,

[23] While not reported in Table 8, the Belk et al. (1980) Table 3 shows this greater than 50 percent co-patronage rate as well for their "light attender" category in both samples for all three

it must be noted that museums were substantially patronized even by non-attenders of the performing arts, although more so in the opera sample, with co-patronage rates above 50 percent in that sample even for those who did not attend any performing arts performances in the previous twelve months.

In fact, a fascinating result in Table 8 is the generally high absolute level of attendance rates at other events among the non-attender sample groups. Thus, between 30 and 49 percent (depending on the sample) of symphony non-attenders still managed to see at least one ballet performance, and between 38 and 58 percent attended at least one theatrical performance. However, for the non-attenders of theater and ballet, the results are highly sensitive to which sample is used, with much lower attendance rates at other art forms in the Southeastern theater/symphony sample compared to the national opera sample. Yet, the relatively high co-patronage attendance rates of non-attenders at other arts forms in the opera sample is a cautionary note to the Belk et al. (1980) claimed result of high crossover audiences among heavy arts attenders.

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performing arts forms. As expected, the absolute rates are lower than for heavy attenders.

The other co-patronage result from 2002 that can be compared to the 1980 results in Table 8 is the high percentages of opera and ballet audiences in 2002 who also attended symphony orchestra concerts. This result is generally also observed in the 1980 data as it relates to ballet and symphony audiences. The percentage of heavy symphony attenders also attending a ballet performance in 1980 ranged from 62 percent to 88 percent in the two samples (in contrast to 30 and 49 percent for symphony non-attenders). Conversely, 77 percent of heavy ballet attenders attended a symphony concert in the opera sample, compared to only 50 percent of ballet non-attenders.[24]

One cannot avoid sensing that the Belk et al. (1980) frustration at the unclear evidence regarding arts audience clustering has not been fully resolved, even by their own analysis. While the non-exhaustive evidence examined above does not confirm Svendson's (1990) extreme suspicions regarding narrowly parochial performing arts fans hostile to rival art forms,[25] the opposite caricature of the voraciously catholic arts devotee also fails to survive close scrutiny. Despite the similarity of characteristics in all performing arts audiences, and the evidence that some art forms like opera and ballet, or opera/ballet and symphonic music, tend to have strong audience overlaps, the ability of researchers to find identifiable pockets of audience segmentation, and the apparent absence of a dominant group of arts "all-rounders" suggests that indeed, not all arts audiences are as alike as the casual observer might think. The surprising evidence regarding the proportion of "non-attenders" of one art form who attend other art forms also supports this cautious conclusion.

However, the evidence that omnivores (who are notably eclectic in their patronage of all cultural forms, including middle and low brow varieties) are a growing segment of arts audiences provides at least indirect evidence that "all-rounder" behavior (with its implied increase in performing arts audience overlap) may become more important in the future. For example, a part of this literature investigates the growing influence of omnivores relative to traditionally defined elites (with narrowly focused "snobbish" interests in only the most prestigious of art forms). Fisher and Preece (2003), further mining the 1998 Statistics Canada survey data, find that despite demographic changes in income, urbanity, and education that would favor a relative growth in snobs, major behavioral changes in those elite populations toward more eclectic cultural (especially musical) consumption patterns has led omnivores as a group to grow rapidly and to be notably younger than

[24] The symphony and theater sample result of only 17 percent audience overlap between heavy ballet attenders and symphony audiences is one of those few results that vary greatly across the two Belk et al. (1980) samples, although this 17 percent result is at least notably higher in that sample than the 7 percent of ballet non-attenders who saw at least one symphony concert.

[25] Such behavior would be more common among univores, who have been found more prevalent among less educated consumers of lower brow entertainments (Bryson, 1997), although extending to the middle classes or even the "upper-middle" classes, but definitely not among the upper social classes (López Sintas and Garcia García Álvarez, 2004). Relish (1997) finds that it is geographic mobility and interpersonal "network complexity," rather than high levels of education *per se*, that is most closely tied to musical consumption across a "wider spectrum of genres," since while the more highly educated did indeed like more types of music than the less educated, "this difference was restricted to a narrower range of more 'elite' genres."

snobs.[26] They provide hope to symphony orchestras in their finding that omnivores, despite their more varied cultural consumption, do not seem to show less commitment to classical music compared to snobs, who qualify for that label largely due to the intensity of their univore type commitment to that art form. They also express some surprise at their own finding that omnivores are more likely to attend theater and dance performances than are snobs, a result that when combined with their earlier evidence regarding strong omnivore commitment to classical music, could suggest that "omnivores are more committed than snobs to the performing arts in general" (Fisher and Preece, 2003, p. 82).

Therefore, even if much of the recent evidence regarding performing arts audience overlap is only indirect (and focused on music), there is reason to believe that the apparent decline, especially among the young and more educated, in narrowly focused cultural consumption (obscuring the boundaries between high, middle and low brow art forms) would also suggest an expansion of the overlap of the audience within any one of those cultural "brow" dimensions. However, any expansion of high arts co-patronage consumption as a result of the more eclectic behavior of omnivores also presents a threat to the arts. Even if one concludes that any "decline of the arts as a form of cultural capital ... is taking place more slowly than many observers had predicted" (DiMaggio and Mukhtar, 2004, p.192), it is clear that the performing arts are facing more competitive pressure from other forms of entertainment, making a coherent definition of the market in which the arts operate (including challenges in estimating parameters such as cross price elasticities of demand) an ever more important research priority. Thus, while the search for an arts boom (discussed at the end of the next section) has reverted to a fear of an arts bust, at least some of the evidence related to questions of arts co-patronage and audience overlap appears mildly encouraging for performing arts providers.

2.3 Stability or Change in Audience Characteristics over Time: The Debate Regarding An Arts Boom and Arts Audience Elitism

Some longitudinal comparisons in audience demographics were made in part 2.2, but are expanded upon in this section.[27] A significant problem in making such comparisons is that survey

[26] They report an increase of omnivores in Canadian classical music audiences from 4.4 percent to 6.9 percent between 1992 and 1998 (snobs fell from 8.8 percent to 7.0 percent of such audiences). In this context, snobs are defined as those who attend only classical music concerts (defined to include chamber, choral, and opera as well as symphony concerts), while omnivores also attend other music performances (i.e. popular, rock, jazz, folk, or country music). See Fisher and Preece (2003), especially Table 1 (p. 74). The growing influence of omnivores has been championed especially by Peterson (1992), and Peterson and Simkus (1993), based on U.S. data.

[27] If there is a null hypothesis to be tested in such comparisons, it is one stated by Heilbrun and Gray, 2001, p. 56): "audience composition appears to be ruled by a powerful inertia." They note that as of 1978, there seemed to be no "consistent evidence of change over time" in the role played by the standard socioeconomic variables of age, gender, education, income and occupation in describing arts audiences, citing the extensive comparisons of arts (including museums) audience surveys from 1959 through 1977 by DiMaggio et al. (1978, p. 34). Whether such stability over that earlier 19 year period extends to an approximately 40 year period from the mid-1960's to 2002, or

populations and techniques, as well as variable definitions are not identical over time, even within the same country.[28] Despite this caveat, the most recent *2002 Survey of Public Participation in the Arts,* or SPPA (National Endowment for the Arts (NEA), 2004) provides data that can be manipulated to generate an approximation to the relative frequency data originally derived by Baumol and Bowen for the mid-1960's (reported above in Table 1).[29]

As in the prior discussions, efforts are made to avoid an excess reliance on U.S. data. However, even O'Hagan's (1996) review of the evidence regarding possible diminutions in the elitism of the arts (he finds no such evidence; see below) relies heavily on such data, since "the most comprehensive data in relation to participation in the arts appear to exist for the United States," which he cites favorably as providing a wealth of information over time based on very large samples of over 12,000 people (p.272). While O'Hagan also cites smaller Irish surveys from 1981 and 1994 (of 1,200 people), and the Arts Council of Great Britain survey of about 8,000 people in 1991, he only uses data from the 1994 Irish survey and the most recent (at that time) 1992 SPPA survey in his analysis.[30]

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the more limited 15 year period from 1982 to1997, or 20 year period from 1982-2002 is addressed in this section.

[28] In fact, the NEA warns in the Executive Summary to the 2002 SPPA results that, since the 1997 SPPA was conducted through a random dial telephone survey with no link to any Bureau of the Census results, while the 1992 and 2002 SPPAs were both conducted by the Bureau of the Census, data from 1997 are not directly comparable to 2002. Furthermore, the NEA warns that since the sponsoring survey was different in 1992 (i.e. the National Crime Survey) vs. 2002 (i.e. the Current Population Survey), as well as differences in the seasons during which the surveys were conducted (each month for 1992 and only in August of 2002), even the 1992 and 2002 surveys should only be compared with caution. Mercifully, the questions used in both 1992 and 2002 were almost identical, and despite the caveats above, there are many inter-temporal comparison made in the 2002 SPPA, including some involving the 1982 results.

[29] The importance of the 2002 SPPA was emphasized by DiMaggio and Mukhtar (2004), who, after bemoaning the previous absence of comparable data collected over time, observed that "relatively long-term trend analysis has finally become possible" (p.172). Of course, what they were celebrating was the apparent ability of the 2002 SPPA to be compared to the earlier 1982 and 1992 SPPAs (despite two differences that do not appear to cause any "systematic" biases; see fn 27 above). Obviously, this 20 year comparison period presents fewer challenges than a 40 year period, which is the reason for the caveats discussed below.

[30] Further evidence of the difficulty in using the variety of international data for examining the topics in this section is reflected in the Heilbrun and Gray (2001) Table 3.2 (p. 45), which painstakingly reports on international arts participation rates based on studies from eight countries plus the United States. Such studies provide, however, a hodgepodge of evidence with each country represented by a different year, ranging from 1976 for Australia to 1997 in the United States, with most of the studies applicable to the early to mid-1980's (five countries), and two to 1988 or 1989 (France and Quebec). While it is true that Wiesand (e.g. 1995) has been providing regular "cultural barometers" for Germany that might be used to provide some longitudinal comparisons, those

Since the Baumol and Bowen (1966) results were adapted from an audience survey (Twentieth Century Fund), whereas the SPPA results are based on participation rates of the general population, it is important to use those 2002 SPPA results that are most applicable to determining the distribution of audience characteristics whose components are normalized to constitute 100 percent of the total.[31] For example, 2002 SPPA Table 8, "Demographic Distribution of the U.S. Adults Who Attend/Visit/Read At Least Once in the 12-Month Period Ending August 2002" reports that 42.7 percent of those attending a classical music event at least once were male and 57.3 percent were female. This is in contrast to what is reported in Table 9, "Rates At Which U.S. Adults Attend/Visit/Read By Demographic Group, 2002 (Percentage Participation at Least Once)," which reports that 10.3 percent of all males and 12.7 percent of all females attended a classical music performance at least once. Since the relative frequencies reported above in Table 1 (from Baumol and Bowen, 1966) for the mid-1960's are defined essentially as "percentage representation of a group in the arts audience compared to the percentage of that group in the total population," it is clear that the relevant comparison for males is 42.7 percent in the classical music audience (from 2002 SPPA Table 8) relative to their being 47.9 percent of the total adult population (a relative frequency of 0.89, indicating that males are under-represented in such audiences relative to the population). The data from SPPA Table 9 are of interest in showing the "penetration rates" of the arts across various demographic characteristics (with the male and female percentages of 10.3 and 12.7 for classical music cited above confirming the relatively limited audience available to symphony orchestras relative to the total population), but are not relevant to the construction of relative frequency statistics.

Because the first SPPA was conducted in the United States no earlier than 1982 (almost 20 years after the period addressed by Baumol and Bowen (1966)), and the relative frequency concept that measures under vs. over-representation of a demographic group in a total population is an important measure that was stressed by Baumol and Bowen in that landmark study, some effort is justified to replicate relative frequency data using the latest 2002 SPPA in an effort to facilitate comparisons across a 40 year period. Since the steps required to replicate this relative frequency data are somewhat complex, and any long term inter-temporal comparisons resulting from such an exercise must be made with caution, more straightforward data from 1982, 1992 and 2002 are also reported directly from the 2002 SPPA. These are supplemented by further analysis focusing on the age variable that was considered sufficiently important to justify an entire National Endowment for the Arts sponsored study "Age and Arts Participation: 1982-1997" (Peterson, et al., 2000). The results are then also discussed in the broader context of the periodic debate among arts economists

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reports do not extend over as long a period of time as do the U.S. SPPA studies and do not appear to be as detailed.

[31] As noted previously, while participation surveys, in contrast to audience surveys, provide valuable information about the entire population, one weakness is that "participation" is typically defined as "attending at least once in the previous twelve month period." Thus it does not capture frequency of attendance. However, starting with the 1992 SPPA, some limited information has been captured about frequency ("average number of attendances per attender") for each of the different art forms, although unfortunately not broken down by attender age, education, income, race or gender. This information is reported later in this section.

about an arts boom and possible modifications in the elitism of the arts, and the degree to which demand growth can ameliorate the significant problems created by the famous cost-disease problem (Baumol and Bowen, 1966).

As previously explained, the table from which the 2002 relative frequency type data can be derived is Table 8 (2002 SPPA). This reports separate percentages of the adult U.S. population by demographic characteristics who attended 11 different types of arts events at least once over a 12-month period (four of which clearly apply to the performing arts as Baumol and Bowen defined them, not including the vaguer category of "other dance"). For example, of those attending a classical music performance at least once from August 2001 to August 2002, 19.8 percent of the total were in the gender neutral age group 35-44 (with all age classifications summing to 100 percent of those attending at least one classical music performance). Similarly, of those attending an opera, 18.9 percent were age 35-44. The figure for ballet is 27.2 percent, while 22.6 percent of those attending a non-musical play were age 35-44. A simple average of these percentages across the four art forms (i.e. 22.1 percent) is of some interest when compared to the percentage of 35-44 year olds in the total U.S. population (i.e. 21.5 percent), but seriously begs the question of audience overlap if it were to be used to construct a relative frequency statistic (which would be 1.03 in that case).

Regarding audience overlap, the Throsby and Withers (1979) interpretation of comparable Australian data (see pp 26-27 above), if applied to the 2002 U.S. case, would result in a range of from 27.2 percent of age 35-44 arts "exposure" with <u>total</u> audience overlap (i.e the highest of the percentages for the four art forms) to the sum of the four percentages with <u>no</u> audience overlap (i.e. 88.5 percent). Since, as noted, 21.5 percent of the U.S. adult population was 35-44 in that period (Table 8; NEA, 2004), the relative frequency statistic would range from 1.27 (with total audience overlap) to 4.12 (with no audience overlap). Continuing with the Throsby and Withers (1979) methodological precedent, their eventual conclusion was that about 25 percent of the Australian population had been exposed to the performing arts (compared to 23 percent in the U.S. from the Ford Foundation study, 1974), which can be shown to be the equivalent of multiplying 2.38 times the simple average of the percentage exposures of their four arts categories (i.e. 17 percent for theater, 9 percent for symphony, 6 percent for opera and 10 percent for ballet, for a simple average of 10.5 percent). Applying a rough downward adjustment to the U.S. case (e.g. 23 percent/25 percent overall exposure = 0.92 x 2.38 = 2.19, or 2.2) allows for the derivation of 2002 U.S. relative frequencies for similar demographic categories as identified above in Table 1 for the mid-1960's.

For the case described above of the age 35-44 group, the relative frequency would be the simple average exposure percentage of 22.1 percent x 2.2 = 48.6 percent, which is 2.26 times the 21.5 percent of the U.S. population in that age group. By contrast, the simple mid-point of the range for the full audience overlap case (a relative frequency of 1.27) and the no audience overlap case (relative frequency of 4.12) is 2.70. Since it is unclear *a priori* whether the mid-point simplification for deriving the relative frequency statistic is less justified (e.g. possibly biased upward) than the "adjusted average" algorithm, both relative frequency results are reported in Table 9.

Table 9
Derived Relative Frequencies of Performing Arts Audience Characteristics
(From the 2002 SPPA, U.S.)

Characteristic	Adjusted Avg Method	Mid-point Method	Characteristic	Adjusted Avg. Method	Mid-point Method
Age 18-24	1.60	1.92	Some College	2.15	2.47
25-34	1.93	2.23	College	4.17	4.81
35-44	2.26	2.69	Graduate School	6.72	7.82
45-54	2.83	3.24	Income < $10 K	1.10	1.31
55-64	2.56	3.00	$10 K - $20 K	1.16	1.34
65-74	2.36	2.78	$20 K - $30 K	1.32	1.53
75 and +	1.34	1.63	$30 K - $40 K	1.94	2.25
Grade School	0.22	0.26	$40 K - $50 K	2.32	2.72
< High School	0.51	0.61	$50 K - $75 K	2.65	3.04
High School	0.78	0.95	$75 K and +	4.34	4.96

Source: Entries are derived from raw data from Table 8 of the *2002 Survey of Public Participation in the Arts* (NEA, 2004) and represent the ratio of the percentage of the demographic characteristic in symphony, opera, non-musical theater and ballet audiences divided by the percentage of that characteristic in the general population. Algorithms are as described in the text above the table.

It is clear that the mid-point method of deriving the 2002 relative frequencies generates uniformly higher values than the adjusted average method. However, it is the relationship among the entries, not their absolute values, that are most revealing and most capable of being cautiously compared to those relevant to 40 years earlier (reported in the U.S. column of Table 1). It is easily confirmed that the ratios of any two values in Table 9 are nearly identical for all of the entries using either approach to calculating the relative frequencies, the result of the algorithm described above.

Regarding age, it is interesting that most entries in the earlier Table 1 (with the exception of only the very youngest and the very oldest) and all entries in Table 9 have values above 1.0. That is, since the merit of the relative frequency statistic is to determine which characteristics are over vs. under-represented in arts audiences relative to the general population, the Table 9 result that all ages are over-represented would appear illogical. While this may indeed be the inevitable result of the necessary imprecision in translating the raw data from the 2002 SPPA into relative frequency measures, the fact that a similar result was reported by Baumol and Bowen (1966) for the four age groupings within the key overall range of 20 to 59 suggests that at least the relative rankings of the Table 9 entries provide useful information. More substantively, in the 1960's in the U.S. the very young 20-24 age group was the most over-represented in arts audiences relative to their size in the population (again, not including any measure of frequency of attendance), with the relative frequencies systematically falling for each subsequently older age grouping. By contrast, in 2002, Table 9 reveals a rising relative frequency from the youngest age classification of 18-24 up to the 45-54 age group, which is the most over-represented in arts audiences relative to the general population. Then, similar to the 1960's, but starting at that much older age classification, relative

frequencies fall for each of the remaining oldest age groupings (but still remain higher than the two youngest groups except for the oldest group of age 75 and older, which has a relative frequency of only 1.34 compared to the 1.60 and 1.93 of the two youngest groups). This result is consistent with other data cited below that suggests that performing arts audiences are becoming older. It is certainly true that the "youth bias' that was represented in Table 1 is not present in the data from 40 years later in Table 9.

Turning to education, one's confidence in the usefulness of the Table 9 entries is further reinforced by the fact that of the six educational classifications, three of them have values less than 1.0 (suggesting that people with those levels of education are under-represented in arts audiences relative to their size in the overall population), and three classifications are greater than 1.0 (indicating over-representation). While Baumol and Bowen reported educational results also by gender, for both males and females two of the five earlier educational classifications had relative frequencies below 1.0, with three classifications greater than 1.0. Since the 2002 classification that is missing from the 1960's results is the extremely low educational classification of "Grade School," it is no surprise that there were three values below 1.0 in 2002 vs. only two values below 1.0 in the earlier data.

While the simplest conclusion would be that the 2002 results fully confirm the 1960's finding that higher education is absolutely critical to determining the demand for the arts and the composition of arts audiences, there are intriguing differences. For example, in the 1960's the boost in arts audience composition (relative to the general population) that resulted from having a college degree rather than just having attended some college was notably greater than in the 2002 data. That is, the relative frequency of male college graduates divided by the relative frequency of males with "some college" is 2.85 in Table 1 (i.e., 3.73/1.31), and the same ratio applicable to females is 2.39. The gender neutral ratio (using either measure in Table 9) of the" college" to "some college" relative frequency is only about 1.94 (i.e., 4.17/2.15). A similar result applies over time when comparing the graduate school to the college ratios of relative frequencies. In the 1960's this ratio from Table 1 is 2.80 for males and 2.66 for females, but has dropped to only 1.61 by 2002 (Table 9). Again, since these results are based on the relative values of the entries within both tables, it is not necessary to be confident about the legitimacy of comparing the absolute values of the respective entries in Table 1 vs. Table 9 to find such results noteworthy. This is especially the case since this result applies also to a comparison of the "some college"to the "high school" educational levels (a ratio of relative frequencies in 2002 of 2.75 vs. 4.51 for males and 4.68 for females in the earlier data), and to a comparison of high school to the "less than high school" educational classifications (1.53 in 2002 compared to the very high ratios of relative frequencies of 7.25 for males and 10.60 for females in the 1960's). Even the ratio in 2002 of the relative frequency for high school graduates to those with only a grade school education is no higher than about 3.55.

Therefore, this relative frequency evidence suggests that, while the degree of audience over-representation relative to the general population continues to increase strongly with educational attainment, the intensity with which this educational over-representation varies with incremental improvements in education has moderated over the past 40 years in the United States. This is broadly consistent with Cwi's (1985) previously discussed view that ongoing improvements in income and education in the general population would make the arts appear to be somewhat less

elitist, even if there were no substantive changes in the basic profile of the performing arts audience. However, this proposition is hardly confirmed by the Table 9 evidence alone and should be viewed as merely suggestive pending more thorough analysis.[32]

In particular, the premise that a 40 year "smoothing" of relative frequency statistics across incremental educational levels implies some drop in the elitism of arts audiences appears to be inconsistent with a quite different metric derived by DiMaggio and Mukhtar (2004) over the shorter period 1982-2002. They derive "arts attendance odds" across differing educational levels (using the SPPA Table 9 statistics on the percentage of any particular demographic group that has attended any particular art form at least once in the past year, in contrast to the SPPA Table 8 data that were relevant to the derivation of the relative frequencies reported above in Table 9 herein).[33] They find that such odds have declined between 1982 and 2002 for both college graduates as well as high school graduates, but that "the odds of high-school graduates participating in arts events have declined even more quickly than the odds of college-graduates" (citing their Figure 3). Therefore, they conclude that there is no support for the notion that the distribution of participation has become

[32] Of course, an overall improvement in real income and educational levels does not imply that overall societal inequality is lessening. Considerable commentary in the United States has bemoaned the apparent decline in social mobility, and traditional evidence as measured by the Lorenz curve, would suggest that income and wealth inequality have been increasing since about 1970 after a long period of declining inequality.

[33] While the derivations are not described in detail, the DiMaggio and Mukhtar (2004) "attendance odds" figures are clearly not the same thing as the relative frequencies derived above in Table 9. For example, the 0.259 odds figure derived for classical music for those with four or more years of college in their Table 2 (DiMaggio and Mukhtar, p. 180) is the result of the following calculation. Table 9 (pp. 16-17) in the 2002 SPPA reports that 21.9 percent of college graduates attended at least one classical music event, while 34.1 percent of those with graduate school educations did the same. Since Table 8 (pp. 14-15) of the SPPA reports that there were 36.1 million college graduates and 17.4 million with graduate education in the U.S. in 2002 (a total of 53.5 million), a multiplication of the percentages by those population figures yields 7.9059 million college graduate and 5.933 graduate school attenders of classical music. Since this total of 13.84 million higher education attendees constitute 25.9 percent of the 53.5 million highly educated population, their odds of attending at least once (recognizing the weakness of not having attendance frequency data) is 0.259. These attendance odds figures can then be compared across other educational levels, across other art forms, and across time using reasonably comparable data from the earlier SPPA reports. By contrast, the relative frequencies derived for Table 9 above use SPPA Table 8 not Table 9 as the core data (representing the relative age, educational and income composition of those who attend at least one, say, classical music performance, with those percentages constrained to sum to 100 percent). Those percentages (e.g. oftlinethe 33.1 percent of all those attending at least one classical music concert who are in the college graduate category) are then compared to the SPPA Table 8 percentage of college graduates in the population (i.e. 17.5 percent) to derive the relative frequency statistic of 1.89. Table 9 in the text reports the results of all such relative frequencies across the differing performing arts forms after adjusting for overlapping audiences as described in the commentary before the table..

more equal over time (p. 183). Furthermore, they find that this growing educational inequality in arts participation is particularly large for opera and ballet, although also notable in classical music (where college attendance rates dropped from 33.4 percent in 1982 to 25.9 percent in 2002, but *proportionately* even more for high school graduates from 7.6 percent to 4.5 percent). While the Cwi hypothesis - that changing demographics will lead to a reduction in the measured elitism of arts audiences - is an important hypothesis to test, it is clear that as usual there are different statistical measures that can be derived for that purpose, with potentially differing implications, especially when the time periods being compared are not identical (see fn. 33).

Another surprising result in Table 9 is that the 2002 data reveal relative frequencies uniformly above 1.0 for all seven income classifications, whereas the 1960's results for the U.S. revealed values above 1.0 for only the two highest of the six income ranges.[34] Nevertheless, both the 2002 and the 1960's relative frequencies uniformly rise with income, but with the over-representation of the highest income group being 3.7 times larger than that of the second highest income group in the earlier data, but only about 1.64 times higher (using either calculation method) in the later data, a result that may be due in part to an understatement of the relative frequency of the highest income group in Table 9 (see fn. 34). To the extent that this result is substantive, even after adjusting for any such bias in the statistic, it is consistent with the point made above about education, where a modestly less elitist audience composition relative to the general population is being observed in the most recent data compared to 40 years earlier. Again, while this is consistent with Cwi's (1985) speculation that the "general population would begin to look more like the arts audience and hence make the arts appear less elitist," it can only be considered tentative in light of possibly conflicting evidence from other types of statistics.

While relative frequency statistics are useful in identifying arts audience characteristics relative to the general population, other more direct measures provide important supplemental information about changes in the performing arts audience over time. An interesting feature of such inter-temporal comparisons is that there is much more evidence stemming from arts participation

[34] One plausible partial reason for this result is that the percentages of the U.S. population in different income classifications in the 2002 SPPA sum only to 89.5 percent (all other classifications: ethnicity, age, and education sum to 100 percent). A footnote to Table 8 in the 2000 SPPA warns that "21.5 million adults did not report their income in the August 2002 CPS" (Current Population Survey, from which those data were derived). Thus, when Table 8 reports that 7.0 percent of the U.S. Population has less than $10,000 in income, that percentage is derived from only those who did report income. While this approach will cause no error if the non-reporting of income in the population survey (which is not used for any tax purposes) is uniformly distributed over all income classifications, it is more likely that lower income respondents comply less thoroughly to the survey than do the generally more educated higher income groups. Hence, the percentage of the population in the lower income groups is most likely under-stated in the SPPA Table 8 data, from which the entries for Table 9 above are derived, while the percentages for the highest income groups are most likely overstated (e.g. Table 8 reports the highest income group of > $75,000 as by far the largest group at 22.2 percent of the total population). If this is true, then the relative frequencies for the lower income groups in Table 9 should be lower and those for the highest income groups should be higher, hence making the 2002 findings more consistent with the 1960's results.

surveys as opposed to audience surveys. For example, it was not possible to find data that would allow a direct comparison to Table 2 above, which showed the income and educational composition of the audience for the four major performing arts forms in the United States. Those data were the result of the never replicated Ford Foundation (1974, Vol. II) study of twelve U.S. cities having at least three of those four art forms.[35] Thus, even though the Ford study was based on a sample of arts organizations, the burden of conducting an exhaustive study of up to 48 such organizations has led to a shift in focus to the periodic NEA sponsored arts participation surveys that also have the merit of studying a sample of the entire population and not just those individuals who are already appearing as part of an arts audience. A reflection of this phenomenon is that the widely cited Rand study of trends in the performing arts in the U.S. (McCarthy et al., 2001) presents only data tables and charts from the NEA's 1982, 1992 and 1997 public participation surveys (SPPA), not from any audience surveys, in their chapter on "Audiences for the Performing Arts." However, as seen in Part 3 below, audience surveys are a common data source for the variables incorporated into the econometric literature on performing arts demand.

The extensive earlier discussion of the complex role of age in arts audiences is reflective of the concern among arts organizations and agencies regarding how that role has been changing. While any modifications in the role of other dominant variables such as income and education have been subtle, the evidence regarding an aging arts audience that was reflected in the relative frequency data of Table 9 when compared to Table 1 is even clearer in light of the Peterson et al. (2000) study (sponsored by the U.S. National Endowment for the Arts) devoted expressly to this issue.[36] Table 10
combines the revealing evidence from Tables 2.1, 2.2 and 2.5 of that study.

Table 10
Age Group Percentage Contribution to Total U.S. Attendance: 1982 - 1997
(S = Classical Music; O = Opera; T = Theater)

Age	S 1982	S 1992	S 1997	O 1982	O 1992	O 1997	T 1982	T 1992	T1997

[35] This is not to say that audience case studies for individual arts organizations are not prevalent. As early as 1978, DiMaggio et al., had identified 270 such studies in their critical review of audience studies for the U.S. National Endowment for the Arts. As noted by Heilbrun and Gray (2001, pp. 41-42), while individual audience surveys are relatively easy to carry out, the requirements for a well-designed population survey make them relatively less frequent (and hence only feasible when sponsored by an agency like the NEA). Nevertheless, the usual simplicity of an audience survey would not apply to the extensive undertaking of the Ford Foundation (1974).

[36] Consistent with the earlier analysis that has shown that the role of age in performing arts demand has been much more complex than suspected (and not just in the U.S.), the Peterson et al. study was itself commissioned to address the controversy that had erupted following the findings of an earlier 1996 NEA Research Division Report (#34) that had found strong support for the proposition that U.S. arts audiences were becoming significantly older. Among those disputing this finding were specific arts organizations who did not agree that their audiences were aging. See the Executive Summary (p.1) of Peterson et al. 2000).

18-19	5.4 (+0.6)*	1.2 (-1.8)*	1.8 (-0.3)	1.0 (-3.8)*	1.2 (-1.8)*	1.6 (-0.5)	3.7 (-1.1)*	1.9 (-1.1)*	1.8 (-0.3)
20-29	21.5 (-2.5)*	12.9 (-5.3)*	11.4 (-4.4)*	16.8 (-7.2)*	11.1 (-7.1)*	11.7 (-4.1)*	25.4 (+1.4)*	13.7 (-4.5)*	14.9 (-0.9)
30-39	24.5 (+3.9)*	18.6 (-4.4)*	13.7 (-9.2)*	22.4 (+1.8)^	20.3 (-2.7)	17.2 (-5.7)*	23.9 (+3.3)*	22.9 (-0.1)	19.6 (-3.3)*
40-49	17.7 (+2.8)*	21.4 (+2.9)*	23.3 (+1.7)*	22.9 (8.0)*	23.1 (+4.6)*	27.5 (+5.9)*	17.9 (+3.0)*	21.7 (+3.2)*	23.8 (+2.2)*
50-59	15.4 (+1.0)*	16.9 (+3.8)*	19.5 (+4.9)*	20.2 (+5.8)*	18.7 (+5.6)*	18.4 (+3.8)*	13.7 (-0.7)	16.6 (+3.5)*	17.2 (+2.6)*
60-69	8.5 (-3.1)*	15.5 (+3.7)*	14.5 (+3.8)*	5.9 (-5.7)*	17.1 (+5.3)*	11.7 (+1.0)	9.8 (-1.8)*	15.2 (+3.4)*	11.3 (+0.6)
70 +	7.1 (-2.5)*	13.4 (+1.0)^	15.8 (+3.4)*	10.7 (+1.1)	8.6 (-3.8)*	11.8 (-0.6)	5.7 (-3.9)*	7.9 (-4.5)*	11.5 (-0.9)^
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Peterson et al. (2000), *Age and Arts Participation: 1982-1997*, Research Division Report #42, National Endowment for the Arts, Tables 2.1, 2.2, and 2.5. Entries are the percentage contribution of each age group to the total attendances for each art form, summing to 100 percent in each case. Values in parentheses represent the difference of the observed percentage contribution to attendance compared to the "expected" contribution based on the percentage that group represents in the total sample. * indicates statistically significant at $p<.01$; ^ indicates statistically significant at $p<.05$. The underlying data are from the 1982, 1992 and 1997 Surveys of Public Participation in the Arts, SPPA, from the National Endowment for the Arts.

While Table 9 provided evidence intended to make some cautious comparisons with data regarding the roles of age, education and income in the arts from 40 years earlier, Table 10 provides more directly comparable data regarding the role of age over a more limited 15 year period**.** The parenthetical values for each entry report the difference between what would have been the expected attendance contribution of that age group based on its size in the population compared to the reality (so that e.g. those aged 40-49 constitute a 5.9 percent larger component of the opera audience in 1997 compared to their size in the sample population). Thus, Peterson et al. (2000) construct information that is in the same spirit as the relative frequency statistics that are reported in Tables 1 and 9, and which adjust for the fact that the overall population in the U.S. is becoming older. Furthermore, for nearly all of these differences between the expected and actual percentages, the statistical likelihood of their occurring merely by chance is very low.

The results reported in Table 10 do not tell a uniformly consistent story. For example, despite a general trend toward older audiences across all three art forms, those 60-69 rose significantly as a percentage of all three arts audiences between 1982 and 1992, but then fell somewhat in 1997 (while remaining higher than in 1982). Also, those aged 20-29 fell over the entire 15 period in all cases,

but recovered modestly between 1992 and 1997 for opera and theater, while the youngest group of 18-19 year olds actually increased modestly as a percentage of opera audiences over the entire period (while, however, consistently representing a lower percentage than would have been predicted by their percentage of the population).

However, the most compelling message of these data is consistent. Over this 15 year period in the U.S., those 18-29 fell as a percentage of classical music audiences from 26.9 to 13.2; fell as a percentage of opera audiences from 17.8 to 13.3; and fell as a percentage of theater audiences from 29.2 to 16.3. Meanwhile, the combined age groups 50 and above rose from 31 percent to 49.8 percent of classical music audiences; from 36.8 percent to 41.9 percent of opera audiences; and from 29.2 percent to 40.0 percent of theater audiences. While it might be unexpected that this age composition shift was least evidenced in the case of opera, it would be surprising if performing arts managers were not able to detect this overall aging of their audiences, as some had argued. One other feature of this evidence is worth noting. In contrast to the relative frequencies for those aged 20-34 in the mid-1960's (from Table 1), which indicated that they were over-represented in arts audiences relative to the general population, by as early as 1982, the 20-29 year old group was notably under-represented in classical music and opera audiences, and only slightly over-represented in theater audiences relative to their size in the population. However, the 30-39 age group started the 15 year comparative period by being over-represented in all art forms (with parenthetical values ranging from 3.9 to 1.8), but ended the period in 1997 being substantially under-represented in all art forms (with negative parenthetical values of -9.2, -5.7 and -3.3, with the turnaround especially dramatic in the case of classical music).

DiMaggio and Mukhtar (2004) make similar observations regarding the comparison of age related participation patterns over the slightly longer 1982 to 2002 period, incorporating the latest 2002 SPPA data not available to Peterson et al. (2000). They conclude that results vary considerably across art forms, with classical music suffering especially high drops in attendance rates among the younger cohorts, in contrast to the large increase in attendance among those older than 47 (especially from 1982 to 1992, with only a slight drop from 1992 to 2002). They also conclude that over the 20 year period, "similar but less consistent trends are visible for ballet and opera" as well as stage plays and musical theater productions - with participation in these performing arts forms remaining stable or growing among most of the older age groups while dropping among younger audiences (DiMaggio and Mukhtar, 2004, p. 177).

Extending the spirit of the Cwi hypothesis, one prime motivation for the interest in any demographic changes in arts audiences has always been the hope among arts supporters that economic and social changes would overcome limited audience appeal and usher in an arts boom that could overcome any fundamental structural problems plaguing the performing arts.[37] Reflecting this focus on a possible arts boom, Baumol and Bowen (1966) has been characterized as "carefully deflat[ing] the notion that the U.S. was then undergoing a cultural boom" (Heilbrun, 1984, p. 34). Evidence of an arts boom has focused on two primary dimensions: (1) related to the discussion just completed, has there been any improvement in the accessibility of the arts to a broader segment of

[37] The focus of the following discussion is on U.S. data, but for an application to Germany, see Kirchberg (1999).

the population consistent with the long standing goal of expanding audiences beyond narrow elites? and (2) regardless of the underlying cause, be it demand shifts or supply shifts, audience deepening or audience broadening, are the performing arts actually growing along with their "host" economies?

As is not uncommon with seemingly simple questions, the competing standards of measurement, conflicting evidence over differing time periods and across different units of analysis, and differential international trends can easily prompt the observation, even within one country, that "the trend of arts activity...is complex and not easily summarized" (Heilbrun and Gray, 2001, p. 38). This is dramatized in the conflicting conclusions reached by two prominent cultural economists in literally back-to-back papers published in the same issue of the same journal (*Journal of Cultural Economics* 20, 1996). Revisiting the "perennial criticism" (p. 269) of the arts that they are perceived as elitist, O'Hagan (1996) concludes that the picture of arts participation patterns has changed little "in any country in the last forty years,"and that based on his more detailed examination of arts participation data for the early to mid-1990's from three countries (Ireland, Great Britain, and the United States), "arts bodies are just 'going through the motions' of emphasizing the importance of access for all to the consumption of the high arts"(p. 276) By contrast, Heilbrun (1996), after reiterating that the geographical distribution of performing artists in the United States had become much more concentrated between 1970 and 1980, found sufficiently dramatic improvements in the accessibility of the arts to the general population between 1980 and 1990 in order to conclude that "the arts... are becoming less and less 'elitist'" (p. 295).

In this particular case, these conflicting conclusions are primarily the result of a focus on two different, although related, aspects of the problem. O'Hagan finds no direct evidence of any lessening of the elitism of arts audiences based on attendance rates as a function of education and income (noting in fact that even with zero admission charges, as in many museums and national galleries, "the socioeconomic composition of attenders is often just as if not more skewed as for other high art forms," p. 277). Heilbrun takes comfort in the evidence that, at least in the United States, the supply of artists (including visual as well as performing artists) per 10,000 population increased substantially in most states, and that despite ongoing "enormous" interstate variations in that ratio, the Hoover index of the concentration of arts activity across states registered a decline between 1980 and 1990.[38] An extension of Heilbrun's results would emphasize either: (1) the role that an exogenous shift in the supply of artists could have on the quantity demanded for the arts as the full price falls with enhanced quantity, quality and availability, or (2) the increase in the quantity supplied of artists to different regions of the country as a result of an exogenous increase in demand for the arts outside of the customarily highly educated, high income, metro population centers.

Since his empirical analysis is not an econometric estimation of structural demand and supply functions, Heilbrun (1996) cannot distinguish between those two potential explanations. However, in an earlier search for evidence of an arts boom in the United States, Heilbrun (1984) had directly addressed the issue of which side of the performing arts market was primarily driving trends

[38] The ratio of artists to population, unsurprisingly, was strongly higher in states with especially large metro areas, but was only inconsistently positively related to income per capita and education, and actually negatively affected by "percent of high income population" (Heilbrun, 1996, Table VI, p. 293).

in overall economic activity. Assessing whether the increase in the ratio of admission spending for the performing arts relative to personal disposable income from 1975 to 1982 was indicative of a long awaited arts boom, his analysis suggested that "the surge in supply was not only a response to increased demand...[but] was also stimulated by a vast increase in public subsidies which made it possible to open up previously untapped markets" so that the rise in relative spending after 1975 reflects in part the "discontinuous process by which supply has been expanded."[39] Interestingly, the Heilbrun (1996) regression results also show consistently positive effects of "state aid per capita" in determining the ratio of artists per 10,000 population, although the effect is only statistically significant for the performing arts in 1990. Thus, both of the Heilbrun analyses are broadly consistent with a supply driven explanation to changes in access to the performing arts.

While supply factors have not been stressed in empirical studies of arts demand,[40] Heilbrun is not alone in drawing attention to the role played by the availability of artists and arts facilities in influencing arts participation behavior. Khakee and Nilsson (1980) share Heilbrun's emphasis on the role of government subsidies in attempting to make music and theater more geographically accessible in Sweden, and stress that the availability of arts facilities cannot be ignored as a key factor (along with income, education, available time etc.) in limiting attendance and creating the potentially false impression that demand for the arts is low. In the same publication, Gold (1980) stresses that a full assessment of whether demand for the performing arts is low in the United States cannot be made without addressing the "absence of opportunity in some communities and the extremely limited supply in others," and warns that even if a major effort were made to increase the availability of the arts "significant supply difficulties and bottlenecks would thwart that objective" (p.156).

It might be casually argued that if demand were sufficiently strong, such supply bottlenecks and limited facilities would not be observed. However, the well-known cost structures of the live performing arts that require relatively large populations to generate sufficient minimum threshold audience sizes and the "indivisibilities" that characterize expanding venue capacity, remind us that expanding performing arts supply is not as easy as expanding or contracting the quantity of shirts or

[39] He further draws various interesting parallels to spectator sports and the process by which expansion of the number of teams in professional leagues (caused by factors including lower travel costs as well as stadium capacity construction issues, not to mention political considerations) can cause jumps in spending relative to disposable income that would otherwise seem enigmatic. Note that while Heilbrun (1984) focused on the aggregate increase in performing arts spending relative to income that began in 1975, his observation in Heilbrun (1996) that access to the arts declined in the 1970-1980 period was based on the more concentrated and less dispersed geographic patterns of arts activity.

[40] Many of the formal econometric demand studies recognize the issue of whether single equation estimation is acceptable in contrast to requiring systems of simultaneous equations to capture the interdependencies of not only supply and demand, but also other possible interdependencies linked to government subsidies and other variables. In general, as discussed in section 3.2.1, the treatment of supply and demand decisions as recursive rather than simultaneous (hence justifying single equation estimation) has dominated.

dinner rolls produced as a function of changing demands. In fact, the Heilbrun (1984) analogy to sports facilities in evaluating "lumpy" supply responses in the arts is consistent with sophisticated econometric work regarding sports in Flanders done by Késenne and Butzen (1987), who find evidence (among many other results) that the supply of sports facilities (especially for volleyball) is a significant determinant of sports participation in that part of Belgium. Blaug (2001) perhaps summarizes this issue best when he asks whether there is a supplier induced demand for the visual and performing arts, and observes that once we characterize artistic goods as experience goods, "it is doubtful whether we can actually identify demand for the arts separately from the supply of the arts - and vice versa" (p. 127). His conclusion that this dynamic interlinking has "not so far been successfully tackled, or even squarely faced in cultural economics" may be too pessimistic, but his listing of this issue as a key agenda item for future research is indisputable (Blaug, 2001, p. 127).

Regardless of which forces are driving the results, the 2002 SPPA (NEA, 2004) that served as the key data source for much of the previous complex analysis of changes over time in audience *composition* also provides simpler documentation of changes in the audience *size* in the United States. Simply stated, while all four primary performing arts forms experienced some increase in "millions of adults attending" from 1982 to 2002 (with compound annual growth rates of 0.56 percent for classical music, 0.74 percent for ballet, 1.29 percent for non-musical plays, and 1.93 percent for opera), the percentage of adults attending at least once actually dropped for classical music (from 13.0 percent to 11.6) and for ballet (from 4.2 to 3.9 percent), although increasing modestly for opera (from 3.0 to 3.2 percent) and for non-musical plays (from 11.9 to 12.3 percent).[41]

In contrast to these 20 year comparisons, the average frequency of attendance between 1992 and 2002 is reported in the 2002 SPPA (Table 7, p. 13), and reveals that the "average number of attendances per attender" actually rose for classical music (from 2.6 to 3.1), which allowed the 10 year compound annual growth rate in total attendance to be a relatively healthy 1.9 percent (in contrast to the anemic 0.56 percent growth rate in millions of adults attending without reference to frequency between 1982 and 2002, as cited above; that comparable growth rate between 1992 and 2002 is even lower, at 0.26 percent). Comparable average frequency of attendance figures for the other art forms between 1992 and 2002 are: opera rose from 1.7 to 2.0, with ballet remaining stable at 1.7, and non-musical plays falling very slightly from 2.4 to 2.3. The combined effect, therefore, of changes in the number of adults attending along with the frequency of attendance is to generate a 10 year compound growth rates in overall attendance of 2.5 percent for opera, consistent with earlier

[41] Compound annual growth rates are derived from the raw data in Table 1 (NEA, 2004, p. 2), with the percentages of attending at least reported directly from the table. Somewhat surprising is the decline in the percentage of those attending musical plays (from 18.6 to 17.1 percent, with a very modest compound annual growth rate of only 0.70 percent). The most notable increases in percent of those attending was registered by art museums and galleries (rising from 22.1 percent of adults in 1982 to 26.5 percent by 2002). Jazz music "exposure" rose modestly from 9.6 percent to 10.8 percent (with a 1.75 percent compound annual growth rate). One indication of the challenge facing the performing arts, at least in the United States, is that even arts fairs and festivals as well as "parks/historic buildings/neighborhoods" had basic exposure rates drop over the 20 year period (from 39.0 to 33.4 percent for the former, and from 37.0 to 31.6 percent for the latter). See SPPA 2002 Table 1.

evidence that opera has been faring better than the other art forms. Total number of attendances actually fell for ballet at a rate of 0.92 per year, with non-musical plays experiencing a less dramatic decline in total attendance at the annual rate of only 0.25 over this recent ten year period. While their focus on the somewhat more obscure issue of the arts as a form of cultural capital (see fn. 20 above) allowed DiMaggio and Mukhtar (2004) to conclude that the role of the arts in that context was declining more slowly than feared, the simpler basic time series evidence regarding percent of adults exposed to the arts, millions of adults attending, and overall total attendances certainly justifies their related conclusion that "some forms of arts activity are losing patronage in the face of competitive pressure (pp. 191-192).[42]

Cultural economists have long stressed the role that growing income and the ability to increase admission prices would have to play if the performing arts are to overcome such competitive forces, as well as the structural challenge of the famous unbalanced growth hypothesis (Baumol and Bowen (1966).[43] For example, Brooks (1997, p. 198) identifies increasing the number of consumers, increasing tastes for the arts, and growing consumer incomes as the three basic ways to expand the demand for the arts, but cautions that the last of these depends critically on the income elasticity of demand, which he suspects is somewhere above unity given the arts' clear status as a "luxury" instead of a "necessity" (at least if one ignores the complex role played by a higher opportunity cost of time linked to higher incomes). Towse (1993) takes comfort in the fact that, despite price increases for major opera houses in the United Kingdom between 1985 and 1990 of between 50 and 105 percent (while the retail price index rose by only 28 percent), both the number of performances and seats sold still increased (by 12 and 19 percent respectively), suggesting a very low price elasticity of demand (Towse, Tables 9 and 10). The determination of price, income and other critical demand elasticities requires more systematic econometric estimation than is revealed by the data analysis above. The next section examines such elasticity and other evidence regarding demand determinants from the econometric literature.

3. Technical Issues in Arts Demand Studies

The complex variety of econometric demand estimation results are described and evaluated by first providing an overview of the studies deriving own price and income elasticities (including an extended discussion of ambiguities in the price elasticity results), and then providing a more

[42] Based on somewhat more sanguine trends between 1992 and 1997 in the United States data, McCarthy et al. (2001) were cautiously optimistic about the health of the live performing arts, although warning that changes in the SPPA survey procedures and a much higher sample refusal rate in 1997 cast doubt on any evidence of increasing arts attendance (pp. 28-29). They do provide good documentation, however, of the dramatic increase in arts participation through the media relative to live performances between 1992 and 1997, and more ambiguously between 1982 and 1992 (p. 31).

[43] Cowen is an exception inasmuch as his optimism regarding this fundamental problem is not based primarily on demand side factors linked to economy–wide growth and the allegedly low price elasticity of demand for the arts, but instead on his direct challenge to the very notion that the performing arts are especially labor intensive or incapable of dramatic technical innovations in production and distribution. See e.g., Cowen (1996) and Cowen and Tabarrok (2000).

detailed analysis of selected particular studies, including those generating important findings beyond own price and income elasticities. That analysis is provided primarily by addressing five particular challenges in estimating the demand for the arts (3.2 and its subsections).

3.1 An Overview of Estimation Techniques and Results: Price and Income Elasticities

Since 1966 there have been 44 econometric studies of the demand for (or consumer participation in) the performing arts (including Andreasen and Belk, 1980, which is not entirely regression based). Not included in that number are highly specialized marketing forecasting models (e.g. the Putler and Lele, 2003, model applied to a university theater company), inspired by Weinberg and Shachmut (1978) and Weinberg (1986), whose "ARTS PLAN" model was originally designed to predict attendance at a university performing arts series as a function of type of event (e.g. popular dance; jazz), season of the year (e.g. spring versus winter), and other variables such as promotional spending.[44] Also omitted from the 44 studies are several manuscripts tangentially dealing with performing arts demand presented at a conference in the summer of 2005, except for Montgomery and Robinson (2005), which has particular relevance to the issue of the product market for the performing arts and whether the arts and sports are complements or substitutes.

Of the 44 studies, 29 make an effort to either directly derive or indirectly impute own price and/or income elasticities of demand for the performing arts in general, or for specific art forms or even individual arts organizations. A few of these studies also included specific numerical estimates of other demand elasticities: cross price (Withers, 1980; Throsby and Withers, 1979; Touchstone, 1980; Gapinski, 1986; Bonato et al., 1990), leisure price (Withers, 1980; Throsby and Withers, 1979), donor price (Luksetich and Lange, 1984), tourism attendance (Gapinski, 1988), education (Globerman and Book, 1977; Gapinski, 1981), advertising (Luksetich and Lange, 1995), "number of shows" (Moore, 1966), and even "unpopularity of conductor" (Greckel and Felton, 1987). Other studies derived coefficient estimates that were not translatable into elasticities, and/or evaluated a large number of additional independent variables, many of which lacked either economic or statistical significance.

While rarely the key focus, some measure of the quality of either performances or of the arts organization was expressly incorporated into the regression analysis by Throsby (1990; a reprint of a paper originally published in the proceedings of a 1982 conference, itself an extension of work begun in 1980); Jenkins and Austen-Smith (1987); Greckel and Felton (1987); Felton (1989); Dobson and West (1989); Abbé-Decarroux (1994); Krebs and Pommerehne (1995); Luksetich and Lange (1995); Corning and Levy (2002); and Urrutiaguer (2002).[45] The Abbé-Decarroux and Grin

[44] Hjorth-Andersen (1992) discusses the "demand structure" in a "case study" of the Copenhagen theater market (including two major and several smaller theaters). But more space is devoted to the cost structure, and only a forecasting equation is reported that links total sales to subscription sales in an effort to access the importance of theater reviews. While that particular result is discussed in section 3.2.5, it is not really an econometric demand study. .

[45] Sometimes these proxies are no more detailed than "program mix" (Jenkins and Austen-Smith, 1987), or "performance night" and "type of play" (Dobson and West, 1989). The listing in the text does not include Kelejian and Lawrence (1980), who suggested a measure of "high brow vs.

(1992) examination of the role of risk in arts attendance behavior is really another exploration of the role of quality perceptions in arts demand. Lévy-Garboua and Montmarquette (1996) identify seven "price and quality" variables in their large database, although none of those variables actually address the actual or perceived quality of an arts performance or organization, and are dominated instead by perceptions of price or cost (unless "parking" is considered a quality variable). However, they confirm the key role played by early arts exposure inasmuch as they explore the process of learning by consuming in the development of subjective perceptions of quality. Quality also played an important role in the empirical analysis of feature movies and Broadway plays by Hirschman and Pieros (1985), in the descriptive study of genre selection and audience segmentation by Levental (1989), and in Huntington, where price was theoretically explored as a proxy for quality (1991). Cameron (1996) addresses the general issue of critics as arbiters of quality in the cultural sector (see also Levy, 1988), and Tobias (2004) examines quality from the supply perspective, finding through regression analysis that aggregated expert opinion is considerably more closely linked to production expenses, mean artistic fees, number of new productions and other organization specific factors in ballet and opera than in theater.[46]

Basic linear ordinary least squares (OLS), especially using the double-log form, was the most popular primary estimation technique (used in 18 studies), but other related techniques such as step-wise OLS (Globerman and Book, 1977; Greckel and Felton 1987; Andreasen and Belk, 1980), double-log weighted OLS (Felton,1992), two-stage least squares, 2SLS (Moore, 1966; Lukestich and Lange, 1984, 1995; Jenkins and Austen-Smith, 1987), as well as conditional maximum likelihood estimation (Corning and Levy, 2002), the almost ideal demand system (Pommerehne and Kirchgassner, 1987), Clawson-Knetsch distance modeling (Forrest et al., 2000), non-parametric linear regression (Schimmelpfennig, 1997), and logit, tobit, or probit non-parametric estimation (eight studies) have been used.[47] One study (Moore, 1966) reported comparative elasticity estimates using six different econometric models. Many studies have embedded within them a variety of techniques designed to correct for the troublesome biases that can plague econometric parameter estimation, or that are necessary steps in employing the primary methodology (e.g., maximum likelihood estimation).

Of the 44 econometric studies, 22 rely upon U.S. data (see fn. 6). Approximately two-thirds of

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low brow" theater performances, but were unable to include it in their reported preliminary regression results. Of those listed, Throsby (1990) and Urrutiaguer (2002) provide by far the most thorough treatments (see 3.2.5 below).

[46] Of these last five citations, only Huntington (1991) is considered in the count of 44 econometric studies, since the others are not primarily regression based, not focused on demand, or because they emphasize primarily the media arts.

[47] This choice of approaches is in no way at odds with standard practice in empirical economics. DiNardo and Tobias (2001) begin their overview of nonparametric techniques by observing: "Even a cursory look at the empirical literature in most fields of economics reveals that a majority of applications use simple parametric approaches such as ordinary least squares or two-stage least squares accompanied by simple descriptive statistics" (p. 11).

all studies report time-series results (including some pooling of time series and cross-section data), but since a few of those studies also include separate cross-section analysis (Moore, 1966; Goudriaan and de Kam, 1983; Luksetich and Lange, 1995) about 42 percent of all studies involve cross-section estimation. Only eight demand studies constitute essentially a case study of one or two specific arts firms, with the rest involving some degree of aggregation among many organizations, with seven reporting results for some version of the aggregate "performing arts" (although three of these also report less aggregated results for separate art forms: Houthakker and Taylor, 1970; Throsby and Withers, 1979; Pommerehne and Kirchgassner, 1987). The most popular separate art form aggregation is theater (including a few studies of the for-profit Broadway theater), identified in 20 studies, followed by symphony orchestras, which were the primary or secondary focus of 16 studies. Separate results were reported for aggregated opera companies eight times and for dance/ballet companies seven times.

The most popular dependent variable definitions were attendance normalized by some version of population, or a non-normalized measure of attendance or tickets sold per time period (at times defined as subscription tickets or single tickets rather than all tickets), both appearing in about one-third of all studies. It is generally recognized that these available measures are far from perfect proxies for arts consumption, especially in a more general utility maximizing model with consumers combining market inputs with time to produce arts "appreciation" (e.g. Globerman and Book, 1977; Throsby and Withers, 1979; Jenkins and Austen-Smith, 1987; Lévy-Garboua and Montmarquette, 2003). Even where the focus is on the seemingly more measurable "cultural experiences," the only plausible proxy is some version of observed attendance (e.g., Gapinski, 1980; Luksetich and Lange, 1995). As noted above, eight studies used either logit or probit techniques and defined the dependent variable in probabilistic terms, while the few remaining studies used a variety of dependent variable definitions such as expenditure shares for given art forms (Pommerehne and Kirchgassner, 1987), percent of the total of 10 types of live entertainment events that were attended in each of those 10 categories (Montgomery and Robinson, 2005; this dependent variable supplements a more traditional variable defined as "log of times a type of event was attended plus 1"), attendance per performance (Abbé-Decarroux 1994; Urrutiaguer, 2002), and frequency of attendance normalized by adult family size (Goudriaan and de Kam, 1983, cross-section model). A variation of an attendance per capita dependent variable is the "visitor rate," defined as the number of people attending from a particular geographic zone in a given week divided by the total population in that zone, used by Forrest et al. (2000), applicable to their use of a Clawson and Knetsch (1966) travel cost model.

Due to the important role played by the concepts of own price and income elasticity of demand in economic analysis generally and in discussions of the demand for the arts in particular (i.e., are the arts luxury goods; is their demand price inelastic?), Table 11 more fully documents the 29 studies that have reported either own price or income elasticities, or both (including those with results that lacked statistical significance). Note that the table omits any regression study that does not derive elasticities, even if it includes income and/or price as variables (e.g. Peterson et al., 2000, which focuses on age and provides important results on income vs education, although having no price data and not deriving any elasticities). The sources of the data are identified (including to which country they apply), clarifying whether the studies were cross-section or time-series, and describing in basic terms the estimation methods that were utilized. While some of the studies apply

to the performing arts in the aggregate, those that estimate different elasticities for specific art forms are designated using simple letters for the art forms (as shown in the heading of the table). Those applying to individual arts organizations are also identified.

The more detailed discussion of the studies identified in Table 11 is organized around the issues identified in the sub-sections of Part 3.2 or in 3.3, or are highlighted in the evaluation of the results in the concluding evaluation. Some of the studies that did not include specific price or income elasticities (and hence are omitted from Table 11) are also highlighted in those sections (e.g., Abbé-Decarroux and Grin, 1992, examining the role of risk; DiMaggio and Ostrower,1990, focusing on black and white race differentials; and Lewis and Seaman, 2004, examining the rarely studied issues of sexual orientation as well as religious affiliation). Eight other studies receive relatively more attention: Moore (1966); Houthakker and Taylor (1970); Withers (1980); Gapinski (1986); Throsby (1990); Felton (1992); Luksetich and Lange (1995), Lévy-Garboua and Montmarquette (1996) and Urrutiaguer (2002). Also, Schimmelpfennig's (1997) examination of the role of price variations across seating sections within a performance hall in correctly assessing the price elasticity of arts demand, as well as the Forrest et al. (2000) analysis of the role of distance traveled in estimating that elasticity are especially noteworthy. Similarly, Globerman and Book (1977) is an early underappreciated contribution, and their effort to explicitly apply household production theory to the role of education in arts demand has not really been replicated.[48] Jenkins and Austen-Smith (1987) is among a small group of studies using simultaneous equation estimation techniques, and makes especially useful observations consistent with Moore (1966) about the relative merits of using OLS versus 2SLS techniques. While primarily a survey study that also uses univariate correlation analysis, Andreasen and Belk (1980) generated limited but provocative regression results regarding life-style versus socioeconomic variables that are detailed in section 3.3. The broader analysis follows Table 11 and some additional summary descriptions of the findings of those studies identified in the table.

[48] While certainly not stressing this variable (and not suggesting any possible link to sexual orientation), Globerman and Book (1977) is also rare in noting the positive effect that "being male and unmarried" has on the frequency of attendance at music and opera performances, *cet. par.* (p. 25). See 3.3 below.

A review of Table 11 confirms that, despite the Lévy-Garboua and Montmarquette suspicion that the arts really are luxury goods with own price elastic demands (2003, p. 211), this view indeed has not yet been justified by the econometric evidence.[49] Regarding estimates of the own price elasticity of demand, 12 studies found that the demand for the arts is price inelastic (a result consistent with the theoretical expectations of Throsby and Withers, although with some caveats, 1979, pp. 28-29; and Throsby, 1994, pp. 7-8), while only four found strong evidence of price elastic demand. Krebs and Pommerehne (1995) reported low short run but high long run price elasticity. However, five other studies found mixed results for the price elasticity of demand, especially when data allowed a more

Table 11
Summary of Performing Arts Own Price and Income Elasticity Estimates: Sorted by Year
(T: Theater; M: Music/Symphony; O: Opera; D: Dance; B: Ballet)

Study	Data	Methods/Techniques	Price	Income
Moore 1966 (see also Moore,1968)	(1) 1928-1963 Broadway aggregate time series; various sources of published data, e.g. *Variety* (2) April 1962 cross-section of 7 theaters and 18 performances via author conducted survey	Naive linear 2SLS linear Naive multiplicative 2SLS multiplicative 2SLS multiplicative (income constrained) 2SLS Semi-Log	-0.48 -0.53 -0.46 -0.56 -0.63 -0.33	0.35 0.36 0.36 0.37 1.03* 0.43 *cross-sect
Houthakker & Taylor 1970	1929-1964 ;Theater, opera (and non-profit performing arts), U.S.; time series	Single equation OLS	Short run "relative" price - 0.18 Long run - 0.31	Short run 0.74; Long run 1.26 *Expend.* elasticities

[49] Their own technically sophisticated study (1996) did, however, find evidence for higher own price elasticities of demand, especially among more experienced theater-goers in France (a result seemingly inconsistent with other studies; see below). Regarding income, while their large database with 58 independent variables did not include a direct measure of income and hence did not explicitly derive an income elasticity, their strong positive results for proxies such as auto and microcomputer ownership were interpreted as evidence for the arts as luxury goods.

Globerman & Book 1977	Audience surveys of 100 arts performances in Ontario Canada, 12/15/73-03/15/74	Step-wise OLS	None	T: 0.76 D: 0.76 M: 0.92 O: 1.07
Withers 1980; Throsby & Withers 1979	U.S. 1929-1973 aggregate across all performing arts; attendance data derived from admissions spending *Survey Current Business*	Conventional (CV) Double-log OLS: Time Allocation (TA) Double-log OLS:	- 0.90 to - 1.19 - 0.62 to - 0.67	0.64 to 1.55 1.43 to 2.78
Throsby & Withers 1979	Australia 1964 - 1974, 7 major companies: aggregated & segmented by art form. Data as provided to IAC Inquiry	Same approach as Withers 1980 with USA data	CV: -0.62 to - 1.00 TA: -0.61 to -1.17	No significant effect in either CV or TA models
Touchstone 1980	Ford Foundation survey data (1965-66 and 1973-74) and other U.S. time series	OLS with dummy variables for arts organization types; grouped by art form and size	(imputed) T: -0.11 O: -0.10 M:-0.13 B:- 0.09	None; income effects strongest for O and B
Gapinski 1981	Ford Foundation U.S. data for large orchestras 1966-1974 time series	Kendall/Spearman correlation statistics plus OLS joint regression income, education	None	0.36
Goudriaan & de Kam 1983	Dutch cross-section survey for 1979 and time series for 1948-1975 for music and theater events receiving government support	OLS linear for cross-section; Double-log OLS for time-series; two separate equations.	None	T: 0.38 T: 0.10 (with educat and age) M: 1.02 M: 0.48 (ed; age)
Gapinski 1984	Royal Shakespeare Co. 1965-66 to 1980-81; Aldwych & Stratford theaters Arts Council data	Double-log OLS on 30 observations of pooled data for the 2 theaters	- 0.66	1.33

Lange & Luksetich 1984	1970 U.S. cross-section of 28 Major, 59 Metropolitan and 41 Urban /Community Orchestras. ASOL survey of member (American Symphony Orchestra League)	Both OLS and 2SLS equations run with and without a "donation price." Elasticities reported next column are w/o donor price. With donor price, all price elasticities drop slightly; and no stat significance for Major.	Overall - 0.49 Major: - 0.39 Metro: - 1.26 Community - 1.37 (not significant)	None
Gapinski 1986	13 London companies (2 theater, 2 opera, 4 orchestras, 5 dance) 1971-72 to1982-83. Arts Council of G.B. & annual reports London Orchestral Concert Board	Singe equation with modified 2-step regression to variably correct for autocorrelation and heteroscedasticity across organizations	T: - 0.07 O: - 0.18 M: - 0.27 D: - 0.29	T: 0.06 O: 0.09 M: 0.27 D: 0.26
Pommerehne & Kirchgassner 1987	German household spending 1964-1984; focused on cinema, theater and a composite "all other." German Federal Statistical Office	"Almost-ideal-demand-system" to derive spending equations; rationality restrictions. Derived for 1964, 1974,1984 and average and high income consumers	T: - 1.65 3 yr avg. average income T: - 1.22 3 yr avg. high income	T: 2.44 3 yr avg. average income T: 1.50 3 yr avg high inc. Low stat significanc e
Jenkins & Austen-Smith 1987	Panel of 35 repertory theaters for years 1977-78 to 1980-81 receiving grants from the Arts Council of Great Britain	Simultaneous system model w. 5 equations including theater supply, donor grants and demand; double-log 2SLS and OLS	+ 1.1 to + 2.5, stat. sig. at .05, (possible quality proxy or poor price data)	0.264 to 0.541 but not stat. sig. (education also in eqns.)
Greckel & Felton 1987	Time-series (mid 1970's - 80's) for Louisville Orchestra (LO) and Louisville Bach Society (LBS); data from organizations	Double-log linear and non-linear equations for each organization; step-wise regression to identify key variables, including conductor popularity	LO: - 0.336 to - 0.46 (not sig) LBS: - 2.33 (not sig)	LO: 2.658 (not sig) to 6.134 LBS: 2.26 (not sig)

Felton 1989	13 U.S. opera companies over 7 or 8 seasons (1979-1986) divided into 3 budget groups; with subscriber vs. single ticket attendance separated; Data from some companies + Opera America	Double-log single-equation OLS. Only subscriber attendance results are significant for only 3 companies	SF Opera - 1.62 San Diego - 1.00 Houston - 0.64	Not significant in any equations
Carson & Mobilia 1989	Time series for Broadway 1975/76 through 1987/88	OLS including lagged dependent variable and seasonal effects. Prior weeks attendance reduces current attend.	Current month neg. not sig.; prior month = - 0.38	- 4.74 in summer; other seasons = 5.78
Bonato et al. 1990	Published time series data 1964-1985; Italy aggregating across theater, opera, ballet, classical and light music	Double-log OLS adjusting for first order serial correlation using Hildreth-Lu	- 0.38	0.78
Throsby 1990	3 Sydney Theater Companies 1974-1978; company data	Single equation double-log OLS	- 0.41 (not sig.)	None
Oteri & Trimarchi, 1990	Italian study of drama attendance	OLS with partial adjustment model accounting for accumulated human capital	Not statistically significant	Not statistically significant
Felton 1992	24 U.S. orchestras (9 years), 14 ballet (6 years) and 12 opera (7 years); 1979-87; ASOL, Dance/USA; Opera America data	Double-log weighted-least square (WLS) for each budget group of each art form, using the standard deviation of the OLS residuals for weights	Avg large M: - 0.57; Avg. small M: - 0.95 Avg. large B: - 0.29; Avg. small B: - 0.13; Avg. large O: - 0.28; Avg. small O: - 0.56	2 largest M: 0.767 to 1.048; Largest B group: 3.088 2nd largest B: 1.868; No effect for O

Abbé-Decarroux 1994	A single Geneva theater over 7 years 1982-83 to 1988-89 (64 productions) Company provided data	Double-log OLS; no serious first-order serial correlation problem; Distinguishes among total demand; full price and reduced price audiences	Total demand: - 0.9945 Full price: - 0.3082 (not sig.) Reduced-price: - 2.4488 (but not sig different from -1.0)	None
Felton 1994/95	25 large U.S. orchestras over 21 years 1971-72 to 1991- 92 ASOL data	Double-log OLS on separate total and subscriber only attendance.	Total attendance: - 0.85 Subscriber: -0.24	Total attendance: 1.40 Subscriber: 0.82
Luksetich & Lange 1995	135 measures of activity for 74 U.S. orchestras1975 though 1984, and 300 measures of orchestra activity for all ASOL members for 1985, 1986, 1987.	Six equation 2SLS simultaneous model with second stage estimated using pooled cross-section, time-series techniques. Separate equations for 3 orchestra sizes.	Major orchestras: - 0.33 Metro: -0.42; Small: - 0.16	Major and Metro Not sig. Small: Negative elasticity
Krebs & Pommerehne 1995	Aggregate annual theater and opera data for Germany (w/o East), 1961/62 to 1991/92	Linear OLS model including quality and lagged attendance variables	Short run: -0.16 Long run: - 2.6	0.1 but not statistically significant
Lévy-Garboua & Montmar-quette 1996	French Ministry of Culture 1987 survey of 8,000 people, including 1,000 theater-goers. Two sub-samples: attended theater last 4 years; attended last year.	Learning-by-consuming model. Heckman 2 step procedure controlling conditional factors and selectivity bias, using probit and then OLS with White's corrected variance-covariance matrix of coefficients	-1.47 very experienced -1.00 less experienced	None (but strong positive results for wealth proxies suggested > 1 income elasticity

Schimmel-pfennig 1997	1995 Royal Ballet Summer Season. 9 performances: *Giselle* (4) and *Sleeping Beauty* (5)	Demand estimated for Orchestra, Grand Tier, Balcony, and Center and 65 Rear day seats. Non-parametric linear regression.	Median for *Giselle*: Orchestra: -3.48 Grand Tier: -1.34 Rear - 3.02 *Beauty:* Orchestra: -5.56 Grand Tier: -1.72 Rear - 4.30	None
Ekelund & Ritenour 1999	ASOL, NEA Research Division for entire U.S. 1973-1992	Single equation linear OLS test of Becker's theory of time costs	Inelastic (highly significant)	0.78 normalized
Forrest et al. 2000	Royal Exchange Theater Manchester UK, for 1992-93, survey data during run *The Brothers Karamazov*	Clawson-Knetsch demand function linked to visitor distances	Point at mean: -1.24 Arc: -1.11; varies with education	None
Corning & Levy 2002	Box office receipts Pacific Conservatory of the Performing Arts (S Calif.); 1990-98; 3 venues	Conditional maximum likelihood estimation for 3 different venues. Double-log "backup"	- 0.05 - 1.36 - 4.87 (stat.sig)	1 of 3 >1.0; 3 >0 but only 2 sig.

Note: "None" indicates that no elasticities were estimated, due largely to an absence of data.

disaggregated analysis of different price ranges, audience characteristics, or type and sizes of individual arts organizations (distinctions also more common in the studies finding high price elasticities). While Withers (1980) and Throsby and Withers (1979), which are quite aggregated studies for the performing arts in the United States and Australia, also find what might be viewed as somewhat mixed evidence on price elasticity, any modest evidence for slightly price elastic demand disappears when the price of leisure is added to the model, and Withers interprets his findings as supporting the view that demand "is not likely to be highly elastic in the short run due to the nature of the performing arts as an acquired taste" (1980, p. 739). The role that acquired taste plays in interpreting price elasticity results is discussed in more detail below in 3.2.3.

In fact, the price *inelasticity* result is much more prominent in those studies, regardless of technical sophistication, that used very aggregative data across all performing arts groups in contrast

to studying individual arts organizations,[50] and/or that used a measure of ticket price (such as total revenue divided by attendance) that does not measure the actual prices paid by different types of consumers (see 3.1.1 below). Notably, Jenkins and Austen-Smith (1987), the only study to find statistically significant but positive own price elasticities, explain the paradox of that finding in part by suggesting that price is serving as a proxy for quality (although they also include a "program-mix" variable suggesting that less "esoteric" productions have a small positive effect on paid attendance), but also due to their overly aggregated measure of price (i.e. an average of total box office revenues over the entire season divided by total season attendance; p. 170).

Thus, the widespread view that the demand for the arts is price inelastic is highly simplified, and subject to misinterpretation unless the underlying reasons for that finding are examined carefully. Studies that make important distinctions among arts consumers include: Pommerehne and Kirchgassner (1987) distinguishing average income from high income; Abbé-Decarroux (1994) distinguishing those paying full price vs. a reduced price; Felton (1989 and 1994/95) distinguishing total attendance from subscriber attendance (the distinction between single ticket and subscriber is made in a number of papers); Lévy-Garboua and Montmarquette (1996) distinguishing more experienced from less experienced theater-goers; Schimmelpfennig (1997) distinguishing among three different seating sections for two different ballets; Forrest et al. (2000) distinguishing among consumers by distance traveled and educational level within those areas, and Urrutiaguer (2002) distinguishing consumers who lend greater credence to the subjective views of drama critics from those who weigh more heavily the quality implied by artistic directors also being manager.[51]

Those studies making important distinctions among individual arts organizations as opposed to using more aggregate data for either the performing arts or for aggregate measures of any one art form (e.g. theater vs. opera) include: Lange and Luksetich (1984) and Luksetich and Lange (1995) distinguishing among major, metro, and smaller community orchestras; Greckel and Felton (1987) using data for individual organizations, and distinguishing between the Louisville Orchestra and the Louisville Bach Society; Felton (1989) distinguishing three different opera budget sizes for both

[50] Of course, this aggregation problem is hardly confined to the arts. The common estimation of supply and demand functions "using uniform prices and quantities across products, yielding a single industry-wide demand elasticity estimate" is criticized in a study of the personal computer market as especially misleading when firms produce differentiated rather than homogeneous goods, since "each product is likely to face a different demand elasticity," ideally requiring a focus on "individual products' attributes and their market position" in estimating demand elasticity (Stavins, 1997, pp. 347-348). For a comprehensive review of heterogeneity and aggregation problems in economics, see Blundell and Stoker (2005), with applications to demand modeling (pp. 350-364).

[51] While not included in Table 11, since he did not estimate actual price and income elasticities, Gapinski (1988) made a useful distinction between tourists and residents using the same database used in his much cited 1986 study of 13 London arts companies over 12 years. He found large positive and statistically significant income coefficients for tourists, but statistically insignificant income coefficients for residents (no price coefficients were statistically significant. But he did derive a "tourist attendance elasticity" of demand that was higher for his aggregate measure of tourists (i.e. 0.645) than for his so-called "high-roller" tourist group (an elasticity of 0.227).

subscriber and single ticket attendance, and deriving elasticities for individual opera companies; Felton (1992) distinguishing both among average groups of orchestras, ballet and opera companies by budget size, and among individual companies within those larger groups; and Corning and Levy (2002) examining a theater company with three different location venues in Southern California.

3.1.1 *Price Elasticity Differences by Level of Aggregation*

Despite particular limitations in each of the studies using more disaggregated data, they understandably generated a richer and more complex array of results than was the case with those studies deriving a price and income elasticity of demand for the overall performing arts. Furthermore, it is noteworthy that those more disaggregated studies were generally (but not universally) more likely to find higher own price elasticities of demand, and to a lesser extent, a wider variety of income elasticities of demand than were the studies that used less precise data and applied to more aggregated measures of either arts organizations or consumer groups.[52]

It is hard to dispute that studies that apply to individual organizations that vary by size, arts type and location, or that distinguish among consumers on the basis of the actual prices paid, income levels, types of seats purchased, or subscriber vs. single ticket status are analytically superior to studies that fail to make such distinctions. Thus, despite the understandable call for more careful econometric work linked more explicitly to models of taste cultivation (e.g. Lévy-Garboua and Montmarquette, 2003), there is reason to believe that an even more compelling problem is to obtain the right kind of data that apply to a more germane unit of analysis, even when using less sophisticated estimation techniques.[53]

The more disaggregated studies generally have higher price elasticities, in part because they often have a better measure of price as well as being able to segment audiences in various important ways. Instead of using the artificially constructed "average price" based on total revenue divided by

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[52] As discussed in Part 2.2, marketing studies are always sensitive to audience segmentation, and while not attempting to estimate precise demand elasticities, they often find evidence suggesting that estimating a price elasticity using an average price will yield faulty results. Colbert et al. (1998) surveyed the audiences of seven theaters in Canada and, unsurprisingly, found a wide divergence in attitudes about ticket prices both between and within groups of subscribers and non-subscribers. They conclude that there are two key segments: one group primarily constrained by a lack of time, and the other by the level of ticket prices. Scheff (1999) surveyed patrons of four major performing arts organizations in San Francisco and found that there was little overall sensitivity to ticket price increases, especially when compared to the greater concern about being able to select specific programs to attend (among both subscribers and single-ticket buyers). However, among those for whom pricing was a significant factor, she recommends "a pricing of higher highs and lower lows" to be more sensitive to different consumer segments.

[53] It is unclear whether the expanded use of large data sets, also recommended by Lévy-Garboua and Montmarquette (2003, p. 211), will itself solve this problem. Larger sample sizes in audiences surveys are likely to be important, however, in addressing the more technical issue they identify of limiting a selectivity bias that may otherwise arise due to the infrequency of individuals attending live events, and changes in frequency rates over time (p. 209).

attendance (commonly necessitated by data limitations; Withers, 1980, adopting a convention prominently used by Baumol and Bowen, 1966, is often cited in subsequent studies), price measures in the more case specific studies often more closely relate to what is actually paid by specific groups of arts consumers (i.e. "transaction" prices).

This issue of the measurement of the price of an arts performance deserves further clarification. Ideally, being able to examine the specific prices paid by different segments of an audience with varying incomes, education, age, values of time and other characteristics would be important in clarifying the price elasticities of demand of different groups and how price elasticity varies with the prices charged, especially when various price discrimination strategies are available to arts organizations, including some that involve the interaction between ticket purchases and voluntary donations that are uniquely available to non-profit organizations.[54] However, since that degree of detail in pricing and consumer data cannot be obtained, it is often thought that the feasible alternative of average price would ideally be calculated as a weighted average of the prices paid (i.e. multiplying the percentage of the audience at each specific price level by those prices and summing the products). But, as Felton (1989) observes, "companies do not carry out such a calculation, so the average ticket price was arrived at by dividing income from ticket sales by the number of attendees," which she laments generated results "that were not always credible," despite the fact that she had done separate calculations for the differentiated consumer categories of subscribers and single ticket holders (p. 120).

However, the real problem is <u>not</u> the absence of weighted average price data, but a resulting average price (using either approach) that no consumer actually faces, as the following simple example illustrates. If a small audience of 145 people is made up of 25 (17.24 percent of the audience) paying $100, 40 (27.59 percent) paying $50, and 80 (55.17 percent) paying $25, both the total revenue ($6,500) divided by attendance <u>and</u> the weighted average price will be identical at $44.83. But no attendee paid $44.83, and most of the audience paid only about 56 percent of that price while some paid more than twice that price. Furthermore, either of these price measurements are susceptible to indicating a price change solely due a modification in the mix of tickets sold, even if not a single ticket price was changed.[55] Additional complications could include ticket scalping or organized discount selling that can generate transaction prices either higher or lower than the revenue received by the organization.[56] Also, the varying average prices paid for different performances as

[54] While Hansmann (1980, 1981) are the classic references to the potential interaction of ticket and donor price discrimination strategies in non-profit organizations, the role of price discrimination in the performing arts, both regarding ticket prices alone as well as with regard to donations, is increasingly well established. See Blaug (1978); Seaman (1985); Cairns (1991); Huntington (1991 and 1993); Kushner and King (1994); and Courty (2003). The especially useful results derived by Luksetich and Lange (1995) regarding the effect on the price elasticity of demand of incorporating both earned and donated income strategies into demand analysis are discussed in more detail in section 3.2.1.

[55] However, this is often seen as a manageable problem when using annual time-series data (Moore, 1966; MacMillan and Smith, 2001).

[56] See, e.g. H. Baumol's (1974) study of last minute discounts on unsold tickets in New York

total attendance and the distribution of filled seats by price section varies day- to-day or between matinees and evening performances, will not typically be captured if total revenue is aggregated over an entire season and then divided by total attendance (as in the previously noted problem with such a measure in Jenkins and Austen-Smith, 1987).

Despite these significant weaknesses, some useful information is admittedly obtained in those many time-series studies using average price data (as listed in Table 11). Furthermore, sometimes an average price calculation comes closer to revealing consumer transaction prices depending on the available alternatives. For example, if the alternative were to simply compute the average price of all seats available in a venue (or a stadium in sports) without any regard for the revenue generated by those seats (e.g. in the above numerical example, the crudest of those averages would be $58.33 if an equal number of seats were available across all sections), the use of total revenues divided by total attendance to derive an average price of tickets actually sold may well be superior, as is argued in the sports demand literature by Depken II (2001, p. 276). However, Coates and Harrison (2005) view both the "weighted average price of available seating"and the "gates receipts divided by total attendance" approaches to the measurement of ticket pricing as having "their advantages and disadvantages, and their proponents and detractors" (pp. 285-286). Their approach was to use both measures in their estimation of demand equations for Major League Baseball.[57]

Given the expected importance of having more disaggregated and targeted price data, what can be said about the results of studies that segmented the audience more carefully, or that focused on less aggregated measures of the performing arts? Caution is always essential in making any generalizations about this literature, and that applies here as well. For example, Moore (1966) found consistently low own price elasticities for Broadway theater tickets even when studying a relatively disaggregated segment of the performing arts (aggregated to be sure across seven Broadway houses and 18 performances, but at least not focusing on the overall performing arts). His somewhat unconventional use of a list price (i.e. "an average of the cost of the most expensive seats for a regular performance of each production;" p. 83) to proxy average price paid can be criticized, but may not have seriously biased his time-series results (see fn. 56 above). And Gapinski (1986) is widely lauded for deriving separate theater, opera, symphony and dance estimates of cross price as well as own price elasticities using quite disaggregated data specific to thirteen individual arts companies in London. Yet he found generally low own price elasticities for each of the individual organizations (varying from - 0.05 to - 0.70), and also generally low cross price elasticities (below 0.20 for four theater and

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City, and McCain's (1987) analysis of scalping in the arts and sports. Moore (1966), whose use of the top list prices at Broadway plays to proxy the average ticket price is novel, recognized this problem in noting that "the average list price of seats may easily differ from the average paid price if tickets are scalped or discounted, if brokerage fees are charged, or if seats at some price sell slower than others"(pp. 83-84). He argued, as have others, that the various possible errors in accurately measuring price can still result in an unbiased index of price used in time-series analysis (p. 83, and his fn. 16).

[57] What they do stress about the ticket price variable is that it is either measured with error or is endogenous, a problem they attack with the use of instrumental variables regression to assess which type of price variable is best in estimating attendance (Coates and Harrison, 2005, p. 286). This problem is not stressed in the arts demand literature.

opera organizations; lower than 0.30 for two dance companies; an average of 0.54 for the four orchestras; but an average of 1.81 for the other three dance companies; see 3.2.4). However, in constructing his nominal price variables Gapinski was forced to resort to dividing attendance into box office revenues (including value-added tax), hence failing to fully capture actual transaction prices or differentiate among consumer groups.

Less aggregated studies generally segment audiences in various important ways that allow for a more precise examination of pricing, as well as other likely demand determining characteristics. Pommerehene and Kirchgassner (1987) segment by income of consumers, with price elasticity for high income consumers lower than for average income (but with both being greater than one in absolute value, and cinema own price elasticities being uncommonly low - results derived from the rarely used almost ideal demand system model). Seating section is the key for Schimmelpfennig's ballet study (1997), which found generally elastic demand for Orchestra, Grand Tier, and Rear Amphitheater sections, with surprisingly high price elasticities even for the more expensive Orchestra seats that supposedly serve higher income patrons. By contrast, the Abbé-Decarroux (1994) results for a Geneva theater are more expected, with an important finding of a high price elasticity of - 2.45 for his "reduced price" consumer group (although not clearly statistically different from 1.0 at the 0.05 level), but inelastic (and not statistically significant) price elasticity for the "full price" group. He is also unique in explicitly arguing that such results "weaken" the conclusions of other major studies that use an overly aggregated average price to derive price inelastic results for the performing arts (p. 105).[58]

Felton's 1994/95 study of 25 large U.S. orchestras found lower price elasticity for subscribers (-0.24) compared to price elasticity for the combined "total attendance" (although still less than unity at -0.85). However, that result contrasted with her pooled time series study of 13 opera companies (Felton, 1989), where subscribers appeared more responsive to ticket price changes than single ticket purchasers (i.e. her only statistically significant results were for subscribers, although the magnitude of the price elasticities varied widely across organizations). Even though subscriber reactions to ticket price changes differed somewhat between her 1994/95 orchestra and 1989 opera samples, she decided to limit her 1992 study of orchestra, opera and ballet companies to subscriber demand based on her

[58] Throsby (1990) found supporting evidence in his equations estimating the effects of three price levels, three levels of "interest" or "appeal"of a play, and three levels of production standard on consumer "valuation" of a play. These utility rather than demand function results found that the strongest influence of price was on the mainly young and less affluent downstairs audience of one of his Sydney theaters, whereas his least price sensitive group was the audience of the most conservative and "middle class" of his theaters, "accustomed, by and large, to paying top prices for theater tickets" (p. 79). Using data on nightly box office receipts for Midsummer Night's Dream at Regent's Park in 1983, Huntington (1991) shows a kinked demand curve based on different price points, but also struggles with explaining generally positive price coefficients (which, as previously noted, he attributes to price as a quality proxy). One's skepticism about deriving an "average price elasticity" from price data calculated as revenue per capita is further strengthened by museum studies that find significant differences in the perceptions about pricing held by different consumer groups. For example, Kirchberg (1998) found that low income groups regard entrance fees as a barrier fives times as much as do those in higher income groups, with education, occupation, and various "lifestyle" variables further broadening this gap.

conclusion that her previous work with opera data had revealed "that season subscribers do react to ticket price changes while non-subscribers do not" (Felton, 1992, p. 2).

Lévy-Garboua and Montmarquette (1996) impute rather than directly estimate price elasticities (see 3.2.3), but derive the surprising result that more experienced French theater-goers actually had higher price elasticity of demand (-1.47) compared to those less experienced (price elasticity close to unity). This seems at odds with the tentative evidence that those buying lower priced seats have higher price elasticities (see above). But then again, more experienced theater-goers need not be the ones buying the more expensive seats (e.g they might be highly educated but underpaid teachers, who are well-documented arts enthusiasts).[59] More fundamentally, this result is inconsistent with the view that price elasticity will be low for an acquired taste like the arts (Throsby and Withers, 1979 et al.; see pp. 73-74 below). In that context, Forrest et al. (2000) find strong evidence for price inelastic demand in those regional zones with particularly high educational levels and higher price elasticities elsewhere, seemingly inconsistent with the Lévy-Garboua and Montmarquette (1996) finding of higher price elasticities for more "experienced" theater attenders who are also likely to be more educated.[60]

Segmenting by organization also has generated more varied own price elasticity results than were found by Gapinski (1986), with an individual Southern California theater group with different venues the focus of Corning and Levy (2002), finding price elasticities varying from inelastic to elastic depending on specific venue. Lange and Luksetich (1984) found higher own price elasticities for smaller orchestras than for large budget major orchestras, but their1995 simultaneous equation orchestra model (where they also incorporated interactions with donations) found generally low price elasticities regardless of organization size (see detailed discussion in 3.2.1).

Thus, while it can be said that the own price elasticities estimated with more disaggregated data are more likely to be greater than one in absolute value (whereas with aggregated data they nearly never are), the extent and significance of those findings have sometimes been overstated.. For example, Felton (1992) is regularly cited for finding low price elasticities of demand for aggregated groups of arts organizations, but significantly higher price elasticities for individual arts organizations within those groups (e.g. Throsby, 1994, p. 8). However, she actually found price elastic demand in

[59] Doubtless the most novel interpretation linked to this finding is that of Köster and Marco-Serrano (2000, p.8, fn. 7), who cite Lévy-Garboua and Montmarquette (1996) for the finding that "the satisfaction degree is bigger among the occasional attenders than in the frequent attenders," suggesting to them that the satisfaction of the occasional attenders stems more from the "sensation of having completed a duty" than from any direct arts consumption "sensorial rewards". Köster and Marco-Serrano focus on the fascinating disparity between what people claim to be their "ideal" free time activities and how they actually spend their time.

[60] Ulilbarri (2005) lends further theoretical support to the idea that more experienced arts consumers should have lower price elasticities in his application of an adaptive utility model to examining consumer choice in the arts. His analysis lends further support to the notion that markets for arts goods will be segmented, in this case due to the varying experiences of consumers at any point in time, with newer consumers being the most sensitive to price discounts (p. 140). See also section 3.2.3.

only 21 percent of her orchestras sample, 7 percent of her ballet sample, and 16 percent of her opera sample. Furthermore, while that paper is sometimes portrayed as distinguishing between industry and firm price elasticities, her pooled data did not include multiple companies in any one art form in any one city (admittedly not possible to do if there is only one local professional opera company or even orchestra; Gapinksi, 1986, is a notable exception), and in some cases did not even have more than one company of any art form in any one city. So her results correctly remind us that individual organizations' price elasticities should not be confused with an aggregate like "performing arts" price elasticity, and that individual firm price elasticities will very widely, but it is not a study well-designed to distinguish market or industry price elasticities vs. firm price elasticities. Furthermore, Felton's earlier study of individual opera companies (1989) reported only three opera companies with statistically significant own price elasticities (for subscribers only, as noted above), with one being elastic (San Francisco), one unity (San Diego), and one inelastic (Houston). So there is no unambiguous finding of price elasticity greater than one even when the focus is on individual organizations.

3.1.2 *Conceptual Issues in Interpreting the Price Elasticity Results*

Regardless of how the empirical price elasticity results vary by level of aggregation or with the sophistication and "accuracy" of econometric technique, it is surprising how little attention has been paid to interpreting these results in light of economic theory. This is especially true of the casual consensus that the demand for the performing arts is price inelastic, but also applies to the periodic alternative findings of higher price elasticities. For example, where there is evidence that those paying full price or sitting in more expensive seats might have lower price elasticity than those sitting in discounted seats, it might be useful to clarify that there is no inconsistency with the general theoretical relationship that for a *given* demand curve, the price elasticity of demand falls with the price (assuming non-constant elasticity demand functions). Since the demand functions should be different for these consumer segments (e.g. high income and education, vs. low income or education, or subscriber vs. single-ticket), there is no presumption that elasticity is varying along the same consumer demand curve.

The fact that price elasticity generally varies with price along a given demand curve as faced by any seller is indeed critical, however, in interpreting the frequent finding of price inelasticity of demand in the arts, inasmuch as the belief that non-profit arts organizations may be purposefully charging lower than ticket revenue maximizing prices is a mainstay of the arts economics literature.[61] It has also been explicitly argued that profit-maximizing sports teams strategically underprice tickets,

[61] Of course, the convenient and very commonly used double-log linear equation specification (see Table 11) generates constant elasticities that do not vary with price, in contrast to a cubic log equation which can generate price elasticities that vary with prices (for an example in sports, see García and Rodríguez, 2002). If the range and level of available performing arts price data is "artificially low" due to either non-optimal pricing, or systematic efforts to make the arts "more accessible," perhaps not just as a public service but as part of a longer run strategy of encouraging people (especially the young) to develop the kind of human capital that can lead to various forms of consumption addiction, we would naturally expect to find relatively low estimated constant price elasticities.

where such non-revenue maximizing behavior has become a standard explanation for the low price elasticities of demand frequently found in empirical studies of sports demand. For example, Marburger (1997) estimates the point price elasticity of demand for baseball as - 0.568 (remaining well less than unity even for generous confidence intervals), with a sample of 516 observations over 20 years, and cites five previous studies of baseball ticket pricing yielding similar results (pp. 378-379). Both he and Fort (2004) observe that sports economists have generally ignored (or treated as insignificant anomalies) the nearly universal findings of price inelastic demand for live sports events (Marburger, 1997, p. 379; Fort, 2004, p. 87). By contrast, they both jump at the chance to explain this paradox as the inevitable result of profit maximizing behavior by sellers of "performance goods," who also receive a share of revenues from a variety of complementary concessions (Marburger), or who receive significant revenues from the media broadcasting of sporting events (Fort), and hence find it rational to systematically underprice admission tickets as part of a strategy to generate larger revenues from all sources.[62]

This reaction of explaining the observed low price elasticities in sports as the result of strategic underpricing, as opposed to unique sports characteristics that would make consumers inherently unwilling or unable to aggressively seek substitutes as a reaction to price increases, is notably different from the reaction of cultural economists to the often similarly low price elasticities found in performing arts demand studies. In fact, it seems that sports economists have generally refused to accept any empirical evidence of price inelastic demand, even using such evidence to conclude that sports organizations were actually following the seemingly more rational unitary elasticity pricing strategy that would be predicted when the marginal cost of filling an additional stadium seat is nearly zero (Marburger, 1997, p. 379).[63] It was this "error" that Marburger and Fort (2004) aimed to correct, although it is clear that their interpretation has still not persuaded all sports economists. For example, Coates and Harrison (2005) express amazement at their finding that (regardless of how they define price) the demand for baseball attendance in the U.S. is strongly price inelastic. They argue that the significant local market power of all baseball franchises should induce them to "operate on the elastic portion of the demand curve," and consider the quest for an explanation for why teams are operating in the inelastic portion of their demand curve "an important question for

[62] Surprisingly, Fort (2004) does not cite Marburger (1997), even though both papers appear in the same academic journal and make the same essential point that sports economists had long dismissed findings of price inelastic demand or had provided inadequate rationalizations, but that in fact there was a perfectly sensible profit maximizing explanation for such results. Of course, the papers differ significantly in the details of making that argument and the empirical evidence provided.

[63] An especially notable study of the Spanish Football League (García and Rodríguez, 2002) finds confirmation of low price elasticities (generally below - 0.5) of demand for all league teams when using a linear model and not adjusting for the possible endogeneity of price, which is inconsistent with "clubs acting as profit maximizers and costs not depending on attendance in a standard monopolistic model" (p. 28). However, they find good evidence for their contention that econometric specification issues should play a bigger role in estimating sports demand inasmuch as their cubic specification using instrumental variables to correct for price endogeneity yields 11 teams (out of 27) with average price elasticities above one in absolute value, although for all teams the null hypothesis of unitary elasticity cannot be rejected.

future research" (p. 298). While shockingly, they cite neither Marburger (1997) nor Fort (2004), their unwillingness to accept the result of price inelastic demand as an inherent feature of baseball, and their sensitivity to the level of prices at which such elasticities are estimated, is utterly typical of the sports literature.

By start contrast, the most common (although not universal; e.g. Lévy-Garbuou and Montmarquette, 1996) reaction among arts economists has been to find econometric evidence for low price elasticities to be consistent with theoretical expectations and non-econometric survey and casual statistical evidence.[64] For example, Throsby (1994) makes the argument first made with Withers (Throsby and Withers, 1979) and repeated in Throsby (2001, p. 116), distinguishing "immediately accessible" (i.e. easy to understand and appreciate) popular entertainments like musicals, "live entertainers" and circuses with the higher arts that reflect an "acquired taste" resulting from the "accumulation of knowledge and experience" that will generate lower price elasticities among established consumers "for whom qualitative characteristics of performances are likely to be decisive"(pp. 3; and 7-8)."[65] While this argument seems consistent with a view that demand for the lively arts is "inherently" price insensitive, it is important to note the Throsby reference to

[64] Examples of such non-econometric evidence would include the common survey finding that price is generally not identified as a key concern to most performing arts patrons (e.g. the previously cited survey evidence from Scheff, 1999 that arts attenders in San Francisco "have little sensitivity to price increases"). Globerman (1978) found little evidence of accurate performing arts price information among the general population surveyed in Ontario, which might be interpreted as a general indifference to prices due to their unimportance, although he stressed the prospect that some people had been deterred from attending performances by incorrect perceptions of excessively high prices, suggesting that price may play a big role in at least a subset of the potential audience. More consistent with the view that price actually plays a surprisingly small role in arts attendance decisions is the finding by Kolb (1997) that, despite price being mentioned most frequently by London (England) students as a barrier to attendance, a more detailed examination of their behavior diminishes the role of price compared to the "entertainment value" of the arts, and the ability of arts events to provide opportunities to socialize. See also Kolb (2002). From a mail survey of subscribers to the American Conservatory Theater in San Francisco (ACT), Ryans and Weinberg (1978) concluded that the "availability of a price discount" was not a major benefit sought by subscribers, being far out-weighed by "makes me more certain to attend." See also Kangun et al. (1992) regarding marketing strategies for encouraging more college student consumption of symphony concerts.

[65] The presumed greater availability of effective substitutes for more accessible forms of entertainment (the more popularized forms of cinema is another example) compared to the more "esoteric" forms of the higher arts would certainly be a key factor that would suggest that demand for the performing arts would be less price elastic than the demand for cinema *at comparable prices* or when evaluated *at competitive equilibria with limited market power.* The necessity of distinguishing the price elasticity of demand at "current" prices from the price elasticity at "competitive" prices is an iconic feature of antitrust economics and law enforcement (as memorialized in the "cellophane fallacy" of incorrectly presuming that no market power was held by Dupont because its latest price increases had seemingly generated considerable consumer resistance, but from already super-competitive price levels; *United States v. E. I du Pont de Nemours & Co.,* 646,669).

"established" consumers rather than all consumers.[66] Thus, there is no necessary conflict with Globerman's (1989) reading of the price inelasticity evidence as suggesting that arts organizations focus their attention on raising prices selectively to the "especially price-insensitive attendees," including opening night audiences (p.10), although there is a conflict with the previously cited Lévy-Garboua and Montmarquette (1996) finding of a relatively high price elasticity for more established theater-goers in France.

But the focus on qualitative factors as dominating price factors as an explanation for empirically derived low price elasticities does not really address the issue raised by Marburger (1987) and Fort (2004) regarding the price levels at which price elasticity is being estimated. The incorporation of various quality factors is also quite standard in sports demand studies (e.g., team record, goals scored, and extent of rivalry with opponent in García and Rodríguez, 2002; the key role of star players in Berri et al., 2004; the newness of sports stadiums versus the quality of play in Clapp and Hakes, 2005). Yet, Marburger and Fort would still stress the influence of strategically low sports ticket pricing in order to maximize a broader definition of profits in generating any low price elasticity estimates. In essence, higher quality will shift a demand curve to the right (which will lower price elasticity for any given price) and possibly also steepen its slope (further lowering the price elasticity at any price), but it is still the case that the observed price elasticities will be the result of the price level either chosen by individual firms with some degree of market power, or the result of the interaction of supply and demand forces in more competitive markets. This point is explicitly recognized by Cameron (1990), who demonstrates unusual sensitivity to the issue of cinema pricing strategies and price level variations across regions in the U.K., and justifies his findings of <u>high</u> price elasticities of demand for cinema by noting that surveys have shown that cinema prices are perceived as being quite high in the U.K. (especially in London), and that this would be the expected result of the significant market power than he attributes to the retail cinema sector in that country (Cameron p. 44; also see fn. 67 below).

In defense of an "inherently" low arts price elasticity of demand, an alternative to the emphasis on qualitative factors dominating ticket prices as the explanation is the universal recognition that ticket price is only one component of the explicit expense of attending a live performance (with transportation, parking and the complementary expenses of dining and even shopping most commonly cited), and an even smaller share of the total expense when the implicit opportunity cost of time is added to the explicit expense to obtain the "full price."[67] While an attempt to account for the value of

[66] And as noted above (see fn. 58), Throsby (1990) found in his utility function estimations that price was especially important to the young and less affluent audience of one of his theaters, and considerably less important to the more affluent and conservative audience of a quite different theater. Thus, despite his frequent focus on the inherent price inelasticity of the arts as an acquired taste, he would be not disagree that such inelasticity varies across audience segments.

[67] In fact, Globerman (1989) would extend this point to popular culture as well, noting that the admittedly less consistent evidence is that demand is price inelastic for those lower arts as well, consistent with the idea that the opportunity cost of time is usually the largest cost of attending any live events (his note 14). However, it is interesting that Cameron (1990, extending his similar earlier results) has found relatively high price elasticities of demand for cinema in the United Kingdom (in the range of -1.53 to -1.6) using pooled cross-sectional and time series data, but when later explicitly

time in demand estimation is sometimes called a test of the "Beckerian theory of time costs" (e.g. Ekelund and Ritenour, 1999), an even more genuine effort to incorporate Becker's theory of "consumers as producers" would distinguish between purchasing a ticket for a performance (a market good serving as a "productive input") and actually consuming the individually produced "art appreciation" (a Becker "Z" commodity that yields direct utility). Once that fundamental distinction is made, there is no theoretical inconsistency between finding a "shadow price-elastic demand for art appreciation" and a "market price-inelastic demand for art consumption" as revealed in ticket price data
(Lévy-Garboua and Montmarquette, 1996, p. 206; also see 3.2.3 below).

Another definition of the "full price" of arts consumption that can reduce the economic significance of the explicit admission price (and possibly justify a lower price elasticity of demand using only ticket prices) is the interaction between admission expenses and voluntary donations. As noted, the potential for price discrimination strategies in the arts is further enhanced by their non-profit status that encourages donations. As argued by Lange and Luksetich (1984), the total price of attending a symphony concert includes both the price of the ticket and any contributions of that patron to the orchestra. The key implication is that, e.g., a 20 percent ticket price increase could be perceived as only a 5 percent increase in the full price of attending if, for example, a patron spent three times as much via donations than via admission expenditures (hence making admission expenses only 25 percent of the total consumption price). Thus, a 10 percent reduction in the frequency of attendance would be measured as a ticket price elasticity of only - 0.50 even though one could argue that the "full" price elasticity was - 2.0. The complex interaction between these two sources of orchestral revenue is further addressed by Luksetich and Lange (1995), who derive the fascinating result (see the detailed discussion in 3.2.1) that all sizes of orchestras could increase ticket revenues with price increases (although in two of the three size classifications at the *partially* offsetting expense of reduced donations, so that total combined revenues still increase).

This conclusion that orchestras are excessively under-pricing tickets is consistent with the argument above that low estimated price elasticities of demand reflect the level at which arts admission is being priced, although it is a variation on the sports literature argument inasmuch as such underpricing may not actually be profit maximizing, but represents a mistake in not fully exploiting their revenue maximizing potential. The distinction between profit maximizing ticket prices (which will also be approximately revenue maximizing if the marginal costs of filling more seats are close to zero) and just "high" or"low" prices is also important in not automatically presuming that seemingly high prices (as in Blaug's study of Covent Garden seat prices, 1978) must suggest pricing in the "price elastic range." As suggested by the Luksetich and Lange (1995) evidence, even if current price levels were viewed as high based on some comparison, they may still be in the inelastic range of an organization's market demand curve for admission tickets.

Finally, it is useful to remember the textbook list of factors determining price elasticity

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testing for rational addiction in the demand for cinema (1999), he found neither strong support for rational addiction, nor statistical significance in his price variable. Fernández-Blanco and Baños Pina (1997) estimate an even higher long run price elasticity of demand for cinema in Spain (-3.51), but do not address the issue of price levels.

variations across different products (always measured as industry or market, and not individual firm or consumer segment elasticities): (1) substitution possibilities; (2) budget share; (3) direction of income effect; and (4) time.[68] Frank (2006) presents a comparison of empirically estimated price elasticities of demand for seven very aggregated product groupings ranging from "green peas" (elasticity of - 2.8) to "theater, opera"(-0.18, citing Houthakker and Taylor, 1970).

What is interesting is his explanation for this finding that the price elasticity of the demand for green peas is more than 14 times larger than for theater and opera performances. He cites two factors: (1) the likely small real income effect that would accompany any change in price for arts consumers who are expected to have much larger than average incomes; and (2) the many more close substitutes for green peas than there are for theater and opera performances, a factor that he considers more telling than the first factor inasmuch as the real income effects accompanying price changes for such small budget items as green peas are also likely to be small, even for lower income consumers (Frank, 2006, p. 128). This explanation is consistent with the view that there is something inherent in the performing arts that would yield very low price elasticities, i.e. limited substitutes (although human capital and addiction issues, or the relatively low portion of ticket prices in some measure of the "full price" of attendance, are alternative and supporting reasons that could have been stressed). Yet again, any such explanation ignores the question of "substitutes at what price?" It also fails to even consider (even if one accepts the implicit gross simplification that this aggregate of theater and opera could relate to specific local entities with assumed monopoly power[69]) why such firms would choose to voluntarily operate so far from the seemingly rational average price level (i.e., the one approximating unity price elasticity when marginal costs approach zero).

In summary, to the extent that the low estimated price elasticities found in much of the sports demand literature can be similarly explained in the arts case as resulting from cleverly conceived (or even grossly mistaken) low price strategies by arts organizations, the attribution of low price elasticities to some inherent characteristics of the performing arts that would suggest inelastic demand at any price, or that would attribute low price elasticities to all consumer segments, or to all performing arts organizations (regardless of type, size, location, or competitive posture) would be naive and mistaken. At the same time, theoretical clarifications as to the full price of arts consumption, either by distinguishing arts attendance from arts appreciation (especially focusing attention on the larger amount of human capital required to produce the latter), or by clarifying the possibly low weight that ticket price alone has relative to the full cost of an evening of arts consumption (including transportation, dining, the value of time, and voluntary donations) could strongly suggest that estimated low price elasticities of demand may indeed provide reliable evidence that arts organizations should move to increase admission prices from *current* levels - the kind of concrete advice that a well-designed demand study should be able to generate.

Furthermore, if price elasticities of demand for the high arts *could* be juxtaposed with those of the lower arts at "comparable" prices (ideally some measure of competitive price or "break-even" prices), there may be sound theoretical reasons to expect more price inelastic demand for the more

[68] This particular listing, while perfectly standard, is from Frank (2006).

[69] A monopoly presumption that has been challenged by Seaman (2004).

"complex" art forms. However, those reasons could not plausibly focus exclusively on the opportunity cost of time, or the ticket price relative to the broader expenses of attending an entertainment event, since those ancillary expenses will often be similar for cinema and other popular entertainments as for theater or opera. That fact, when combined with the higher absolute price levels for the performing arts relative to, say, cinema (although perhaps not when compared to the prices at a rock concert), result in ticket prices being a higher proportion of the full attendance price in the performing arts compared to the more popular arts, arguing *ceteris paribus* for relatively higher, not lower, observed price elasticities of demand in the performing arts when compared to the popular arts.[70]

3.1.3 *Income Elasticity Differences by Level of Aggregation*

Despite there being somewhat mixed results on price elasticity, the discussion in 3.1.1 concluded that more disaggregated studies do tend to find higher price elasticities of demand for more theoretically defensible and useful units of analysis (individual organizations varying by type and size; identifiable consumer groups varying by seating section, income, subscriber status, or discount vs. full price). The results are even more ambiguous for income elasticity. Pommerehene and Kirchgassner (1987) find greater than 1.0 income elasticities in German theater for both average and high income consumers (finding also that higher income people have lower income elasticity than do average income people, consistent with the common notion that income is positively correlated with the value of time, which lowers the "unadjusted" income elasticities relative to the more defensible derivation of "adjusted" income elasticities; see Withers 1980). However, while they use this differential income result in their summary, they warn about the low level of statistical significance in their income results and note that "income elasticities are not much larger than one" (p. 48).

Felton's results are more indicative of the varying income elasticity derivations in even these more refined studies. Felton (1989) found no statistically significant income elasticities for her individual opera companies, and found (1992) income elasticities of either less than one or about one for her two largest orchestra groups (again, while this is still fairly aggregated, it at least distinguishes

[70] A focus on the weight of the admission price relative to the full consumption price would suggest that a sport like cricket, where a match can last beyond a day in length, would have the lowest comparable price elasticity of demand of nearly all live entertainments (including the performing arts) for any opportunity cost of time. But such a finding should not *necessarily* lead one to argue that cricket is addicting, or that this result is due to cricket being an acquired taste dependent upon more complex human capital inputs than other sports or the arts. Despite the insightful analysis of county cricket, Paton and Cooke (2005) do not estimate price elasticities.

orchestra size). Felton (1992) did, however, find "luxury" good evidence for her highest and second highest budget samples of ballet companies (but nothing significant for opera). Felton (1994/95) also found a higher income elasticity of 1.4 for her "total attendance" group vs. an elasticity of only 0.82 for her "subscriber" database for U.S. orchestras. By contrast, Luksetich and Lange (1995) found no statistically significant income elasticities at all in their large market vs. small market study of orchestras. Unfortunately, neither Schimmelpfennig (1997) nor Abbé-Decarroux (1994), who did such useful work regarding more disaggregated price elasticities, were able to estimate any income elasticities since they lacked income data.

Superficially, the strongest evidence for income elasticity estimates being notably different when less aggregated data is utilized is Greckel and Felton (1987), who derived an income elasticity (using regional real per capita income) of 6.134 (statistically significant at the .01 level) in their second demand equation for the Louisville Orchestra (1973/74-1983/84). However, their other orchestra income elasticity of 2.658, as well as the 2.26 estimate for the Bach Society (in Louisville), were not statistically significant. Furthermore, this suspiciously high income elasticity of 6.134 is derived in an equation with only ticket price and concert hall capacity as control variables. The authors note that several organizational quality variables, as well as promotional expenditures, were dropped due to poor performance. However, they do not discuss reasons for omitting some measure of regional age distribution or educational level. Either multicollinearity concerns, or a lack of variability in those measures over the relatively brief 10 year period could have been cited, but neither is real per capita income likely to vary greatly in a decade. Even more importantly, that high income elasticity estimate dropped to the 2.658 noted above and lost statistical significance when a proxy variable was added to account for a four year period in which the conductor of the Louisville Orchestra and his successor were widely unpopular (the only statistically significant variable in that equation, but with a relatively low elasticity of - 0.301). Hence, this evidence for higher income elasticities of demand when using organization specific data is not compelling.[71]

The Greckel and Felton (1987) study is notable as one of only nine focusing on individual performing arts organizations. However, in addition to Abbé-Decarroux (1994) and Schimmelpfennig (1997) cited above, Throsby (1990) and Forrest et al. (2000) lacked income data. Abbé-Decarroux and Grin (1992) estimated logit models that included pre-tax monthly personal income, but those estimated probability coefficients (of going to performances more than twice per year) were quite small (although statistically significant for two of three organizations). Only one of the Corning and Levy (2002) income elasticities for their target theater company across three geographical venues exceeded one while also being statistically significant. Gapinski's (1984) study of production and demand functions

[71] Carson and Mobilia (1989) also find high standardized income elasticities for Broadway that are highly sensitive to seasons, with highly positive income elastic demand for the fall, winter and spring seasons, but highly negative income elastic demand during the summer season. Given the outlier nature of their estimates (+ 5.78 to - 4.74) and the lack of any modeling foundation compared to, say, Moore 1966, who found dramatically different results (although not adjusting for seasonality), it is difficult to know how much weight to place on these income elasticity results. They also found unusual evidence of a negative effect of past consumption on current consumption, although their focus on weeks rather than years as the relevant time period adds credibility to that result given the well-known sporadic attendance patterns of many arts consumers (see also 3.2.3 below).

for the Royal Shakespeare Company (RSC) does generate a statistically significant income elasticity above one (1.33) in an equation with only price and the constant term. While he is willing to conclude that "an RSC cultural experience is a luxury good," he faced considerable difficulty in eliminating autocorrelation and heteroskedasticity problems and, even after correcting for those problems, was forced to eliminate seven of his eight demand equations "because of intercept or substitute-price insignificance" (p. 463). Thus, the evidence is quite mixed that estimating demand at the individual organizational level will reliably result in higher income elasticities compared to more aggregated data.

In summary, and ignoring the further issue of the proper interpretation of the results (section 3.1.2), we can conclude that the own price elasticities reported in Table 11 are sensitive to the level of aggregation of the data, with the conventional wisdom of a price inelastic demand for the performing arts significantly weakened by more refined studies that distinguish individual from groups of organizations, and that more carefully segment differing consumer groups and are also able to more clearly identify actual transaction prices. However, the finding that income elasticities of demand for the arts are not compellingly high, and are generally inconsistent with the arts being luxury goods, is not particularly sensitive to the level of aggregation of the analysis. Income elasticities, however, are more likely to be high in those very few studies attempting to separate the price of leisure from the "pure" income effects, most notably Withers (1980), whose "time-allocation" estimates ranged from 1.43 to 2.78. The Ekelund and Ritenour (1999) variation, which is not as carefully specified, generated a normalized income elasticity of 0.78. However, while that separation is clearly important to properly isolate the "pure" income elasticity effect, neither of those studies controlled for either education or some alternative measure of arts experience or training (see 3.2.1 and 3.2.2 below), hence providing incomplete evidence regarding the arts as a luxury good

3.2 Are There Unique Challenges to Estimating Arts Demand?

A persistent theme among cultural economists has been the degree to which the arts represent merely another application of standard economic methods as opposed to a truly unique analytical challenge.[72] References have already been made to the commonality in econometric work of unresolved aggregation and product-differentiation problems and the utilization of standard parametric linear estimation. It is therefore not surprising that Lévy-Garboua and Montmarquette begin their own brief survey of arts demand (2003) by initially suggesting that specifying and estimating arts demand "is not essentially different from the demand for more down-to-earth consumer goods and services," and that only after confronting those standard problems should one consider the "specificity of 'art'" (p. 201). However, regarding the characteristics of art that are especially problematic, they highlight those that challenge the following conventional assumptions generally made to simplify empirical

[72] Among many possible references, Frey (2000) provides a carefully reasoned overview. Throsby (1994) characterizes Scandizzo (1992) as finding that growth rates for cultural consumption are "chaotic and unstable, due to the fact that it is rational to respond to the peculiar cumulative features of culture in a seemingly irrational way"(Throsby, 1994, p. 3). While Throsby then argues that "notions of mystery, imagination and the unfathomable creative impulse" are no doubt present in production and consumption decisions in the arts, the analysis of aggregate data is able to find systematic patterns basically consistent with standard economic theory.

analysis: (1) product homogeneity; (2) established and not dramatically heterogeneous tastes; (3) independence of choice among individuals; and (4) quality variations that, where important, might be measured more tangibly without raising troubling issues of "aesthetics."[73]

A somewhat related categorization scheme is used here to thematically organize the discussion of how particular studies confronted the standard as well as the unique problems of estimating arts demand.[74]

3.2.1 *The Basic Problems: Measurement and Modeling*

The most common research lament deals with the inadequacies of the data.[75] Historically, cultural economists may have had a strong case that the traditional lack of business savvy among artists and arts organizations that hindered coherent data collection and reporting, when combined with the tedious but perennial question "what is art?" made their job especially challenging. Without doubt, the seminal impact of Baumol and Bown (1966) was in large part the result of their uniquely rich database in addition to the provocative quality of their analysis. Even then, empirical work in the performing arts was nearly impossible prior to the Ford Foundation's extensive survey (1974),[76] followed by another by the National Research Center of the Arts (1976), which also stimulated efforts in other countries to further improve the quality of their own data. Therefore, one feature of many topics in the arts economics literature is the degree to which basic data gathering and attempts to develop consistent standards of measurement have competed for attention with modeling and analysis.

Conditions have certainly improved in terms of tax-financed studies such as that traditionally done by the venerable Arts Council of Great Britain but also extending to other countries (e.g., even in

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[73] Shanahan (1978) provides a traditional version of how aesthetics may complicate the analysis, but Lévy-Garboua and Montmarquette (2003) are more optimistic. After conceding that "the extent to which aesthetic emotions are amenable to economic analysis and measurement remains to be shown," they cite their 1996 study in support of using the directly reported satisfaction of those experiencing an arts event as a surprisingly easy way to confront the problem (2003, p. 211). This is discussed further in 3.2.3 and 3.2.5 below.

[74] While some papers are quite logically discussed in one of these particular categories, it should be clear that at times the variety of issues addressed by any given paper could have qualified it for inclusion elsewhere, including in categories not identified in this listing.

[75] One example of both the problem and the improving conditions (noted below) is the Luksetich and Lange (1995) observation that in all of their earlier work on symphony orchestras they had been severely constrained by data limitations, including an absence of usable data for more than one year. However, due to the generosity of the American Symphony Orchestra League providing them with truly extensive data on a proprietary basis, they were now able to seriously address those limitations (p. 51).

[76] In addition to the descriptive data published by The Ford Foundation (1974) and discussed in section 2.1, more extensive Ford data was also critical for some econometric demand analysis (e.g. Touchstone, 1980; Gapinski, 1981).

the United States, where despite desperate under-funding, the NEA Research Division has frequently generated data that have become international benchmarks, as with the periodic Surveys of Public Participation in the Arts). These government efforts have been supplemented by an increasingly rich array of private non-profit and university centers devoted to arts research.[77] Furthermore, despite the frustrations of obtaining reliable data from arts organizations, it is also common for authors of arts demand studies to cite the unusual degree of cooperation (sometimes after failed efforts) given to them by individual or groups of arts organizations (e.g., Felton, 1989 paying homage to Opera America for rescuing her after receiving assistance from only five of 20 personally contacted opera companies; Schimmelpfennig, 1997 getting unusual cooperation from the Royal Opera House Covent Garden; and Abbé-Decarroux and Grin, 1992, working closely with three major cultural organizations in Geneva).

[77] This phenomenon is especially notable in the United States, where the more modest governmental role in arts financing and policy-making has created a void to be filled by such organizations.

One dilemma that is not unique to arts economics but is quite prevalent in this literature is that a particular data set or research agenda that may overcome one type of missing information problem, or that may address one deficiency in previous research, may be incapable of incorporating other critical demand determining variables whose exclusion is undesirable in a fully specified demand model. For example, Globerman and Book (1977) use audience survey data and an explicit household production model to try to improve the estimate of the income elasticity of demand by directly incorporating the role of education in increasing productivity in the consumption of arts activities. However, they lack ticket price data and "borrow" long-run price elasticity results from Houthakker and Taylor (1970) to draw certain inferences about the relative productive effect of education on the arts compared to other activities in the aggregate. Lange and Luksetich (1984) obtain data that allow them to derive price elasticities that vary across three different types of orchestras, but the lack of consumer income data in their regressions raises questions as to the reliability of those results.[78] Other examples of studies that address previous weaknesses in the literature but cannot escape problems with missing variables include: (1) Throsby (1990), who addresses the absence of systematic quality variables in previous arts demand studies, but is missing income as well as education data in his analysis; (2) Forrest et al. (2000), who effectively incorporate distance traveled into their theater demand analysis but are able to use education and age as the only control variables in their equations; (3) Schimmelpfennig, who confronts the issue of price elasticity variations as a function of differing seating sections in a ballet theater, but has no other control variables and is forced to use a quite restrictive assumption about product homogeneity across two different ballets;[79] (4) Lévy-Garboua and Montmarquette, who provide an unusually rich analytical framework to assess "learning-by-consuming" supplemented by a database with 58 independent variables, but that does not allow the direct measurement of either consumer income or arts admission prices; and (5) Lewis and Seaman (2004), who are able to use unique data from the U.S. General Social Survey to address the previously ignored topic of sexual orientation (and religious affiliation) in arts demand controlling for many other demand determining variables, but cannot incorporate any arts pricing or quality variables given that particular data source.

In addition to data limitations, economists have wrestled with the important issue of whether to

[78] For example, see Green et al. (1992) on the bias created by omitting income in demand function estimation.

[79] The Royal Ballet Summer Season that is examined consists of 16 performances (nine of which included in the estimations) of two full-length works (for 1995, *Giselle* and *Sleeping Beauty*). Schimmelpfennig uses the highest prices for (eventually) three seating categories. Such prices are the same for each performance of any one ballet, but that price schedule is higher for *Sleeping Beauty* than for *Giselle*. Therefore, he is forced to assume that both ballets are homogeneous in order to get the necessary price variation across his observations, an assumption that he recognizes (p. 121) is contradicted by the very existence of two different price schedules, but that he views as acceptable for his purposes of examining the relationship between actual prices and revenue-maximizing prices. That he finds evidence of elastic "median price elasticities" for both ballets across each of the three examined seating areas (with such elasticities especially high for both the highest and lowest priced areas) runs counter to the bulk of the evidence about arts price elasticities, and his policy proposal for price cuts is similarly unusual, although it explicitly recognizes the link between price level and estimated elasticity that is often missing from the arts demand literature (section 3.1.2).

model arts demand using a single equation by treating the performing arts market as essentially a recursive process in which supply decisions are not determined in the same time period as demand, or to model arts demand as one of several equations in which key endogenous variables are determined simultaneously, hence requiring more complex estimation techniques. These measurement and modeling issues are exhibited by describing the key features of Moore (1966), Withers (1980), and Luksetich and Lange (1995). Some of the essential features of these papers have been alluded to previously, including price measurement issues and the most important results. The focus is on the modeling, including how the available data influenced modeling choices. Clearly, only the most critical features of these papers can be addressed here.[80]

1. Moore: "The Demand for Broadway Theatre Tickets" (1966)

Moore's (1968) *The Economics of the American Theater* has not as much influence as Baumol and Bowen's treatise published two years earlier (1966), but it is rightly regarded as a classic in cultural economics. The essence of the demand analysis that was published in 1966 focuses on the question of why Broadway attendance had increased so modestly between 1933 and 1963 (20 percent) despite an increase of 160 percent in real per capita gross national product, a more than doubling of ticket sales for spectator sports, and a more than tripling of spending on the performing arts.

Moore does not present an explicit utility maximizing framework, but focuses on developing a defensible econometric model to estimate critical demand elasticities that may solve his puzzle of observed low Broadway attendance growth. Since ticket prices are fixed in any one time period, an explicit time-series model is necessary to derive price elasticity, and a more broadly defined full attendance cost elasticity of demand.[81] Since the role of income is complicated by its relationship to both the price of tickets purchased and other features of the explicit and implicit cost of attendance, he also explores those relationships through a cross-sectional audience survey of seven Broadway houses and 18 performances. Using the cross-section results he runs preliminary regressions to isolate the effects of income and "time to go home" on the dependent variables: cost of evening, cost of evening per person, cost of tickets, and cost of everything but tickets per person. He also uses the cross-section survey results to estimate an income elasticity of 1.03 based on relative frequency of attendance as a function of income.

His time-series model includes three equations related to the i^{th} time period, with A representing

[80] Another modeling issue that has been less prevalent in the arts demand literature, but is nevertheless important is the functional form to choose when estimating a system of demand equations for differentiated goods so as to make parameter estimation feasible. For example, both logit and the almost ideal demand system (e.g Pommerehne and Kirchgassner, 1987) can be viewed as imposing constraints on substitution patterns so as limit the number of parameters that would have to be estimated.

[81] Throsby and Withers (1979, p. 111) observe that time-series analysis is more appropriate "for past analysis and for prediction" since time-series data is capable of describing the effect on behavior of *changes* in a variable whereas a cross-section elasticity can only describe the effects of *differences* in that variable.

attendance[82], Y income (which he adjusts in estimation to be a "permanent" as opposed to "actual" income measure), C the cost of attending the theater, S the number of shows (musicals and non-musicals), P ticket prices, M a dummy variable for sound movies, T the transportation cost to the theater, and O the other costs of attending a Broadway play:

(1) $A_i = f(Y_i, C_i, S_i)$
(2) $S_i = g(A_i, P_i, M_i)$
(3) $C_i = h(P_i, T_i, O_i)$

He then postulates that average attendance per show is probably a constant, so that a long run equilibrium condition can be expressed as $A = \alpha S$, yielding a four equation system with four endogenous variables, A, S, P and C. However, since it cannot be assumed that the market is necessarily ever in long-run equilibrium, price is treated as exogenous. Furthermore, given the lack of adequate data regarding travel expenses and other expenses of attending the theater, he assumes that such costs, including those related to population movements within the New York area, have no trend over his 1928-1963 time period and are uncorrelated with the other variables, allowing him to drop equation (3) and substitute price P_i for cost C_i in equation (1).

These modifications allow him to estimate three basic variations of the model: (1) a "naive" approach that assumes that the supply of shows is determined outside the system, estimated both as linear (with elasticities defined at the means) and multiplicative (with elasticities given by the coefficients), where attendance is regressed on price, income and the number of shows, with a dummy variable for movies added in some formulations; (2) a simultaneous equation approach using two-stage least squares (again both linear and multiplicative) that does not treat shows and attendance as a recursive process; and (3) two-stage estimation, but with the income elasticity constrained to equal its value estimated from the cross-section data (i.e. 1.03) as a way to limit the bias in the income elasticity estimate created by the absence of population and travel expense independent variables, which are likely to be correlated with income. While Moore (and others, e.g. Throsby and Withers, 1979, p. 111) recognize that the use of a cross-section estimated income elasticity to correct for this potential bias in the time-series estimation of the relationship between income and attendance is problematic, any possible upward bias in the other coefficients caused by this "extraneous estimate" appears to have been minor, inasmuch as the price elasticity in this "constrained" two-stage case increases only to 0.632 (in absolute value) when compared to the 0.558 estimated from the same two-stage equation without income being forced to its cross-sectional value. There is also only a modest effect on the

[82] It was previously noted that Moore estimated price using an average of the most expensive seats for a regular performance of each production during his chosen month of February for each year, an approach whose weaknesses he recognized but considered acceptable as an unbiased index over time (1966, p. 83). But the derivation of attendance figures was also not without complexity. Attendance for an average week in February of each year was estimated by "dividing the total gross receipts for musicals and nonmusicals separately by the average top ticket price," which was then multiplied by 1.6, defined as the "mean ratio of the price of the best seats to the average list price of all seats during the 1950's," with the two resulting figures summed to get the total of musical but nonmusical attendance (p. 83). Moore obtained much of these data from *Variety* magazine, as noted in Table 11.

"number of shows elasticity of demand," which rises only to 1.143 in the constrained equation relative to its value of 1.07 in the unconstrained case.[83]

While there are many aspects of the Moore (1966) analysis that are of interest, the four most important results are: (1) as documented in Table 11, the essential price and income elasticities are less than one in absolute value, and those results are largely independent of the specific econometric specification utilized; (2) the low income elasticity results in all of the time-series estimations were surprising to Moore and prompted him to observe that he had not been capable of controlling for the opportunity cost of time in theater-going, a factor likely to be especially significant for high income patrons; (3) despite the fact that Moore believed that it was a "dubious" assumption to consider the number of shows (his equation 2) as being determined "outside the system," the fact that shifting to two-stage estimation increased the price elasticity results only trivially compared to the naive single-equation cases (i.e. from an absolute value of 0.482 to 0.532 in the linear case, and from 0.453 to 0.558 in the double-log multiplicative case) has led most later researchers to justify the use of single-equation recursive techniques as opposed to developing simultaneous equation systems to estimate arts demand; and (4) despite (3), there have been some creative attempts to develop multi-equation models, although it is unclear how much they were inspired by Moore's early formulation.[84]

2. Withers: "Unbalanced Growth and the Demand for the Performing Arts: An Econometric Analysis" (1980)

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[83] However, the total R^2 computed on the basis of attendance with income removed in the constrained equation is only .554 in contrast to being .80 in the unconstrained case. In general, R^2 values are uniformly high across all of the Moore formulations - as high as .878 in the naive linear case, and no lower than .626 in any other case (i.e. the two-stage least squares semi-log model).

[84] One paper that was certainly influenced by Moore (1966) is Kelejian and Lawrence (1980) which is often cited despite its only quite preliminary regression results. This is due to their audacious seven equation model of Broadway theater demand that proposes to estimate: (1) tickets demanded; (2) the number of tourists; (3) the amount of crime; (4) aggregate New York region income; (5) theater sector income; (6) the average tax rate imposed on city residents; and (7) the city population. They only reported preliminary results for the tickets demanded equation as a function of the number of tourists, the population in the city versus the suburbs, the price of tickets, the amount of crime, and a trend variable, and no further results were ever revealed. While not citing Moore (1966), Jenkins and Austen-Smith (1987) develop and test a five equation model with dependent variables theater price, program mix, arts council grants, local authority grants, and quantity of tickets sold. As noted above, their statistically significant positive ticket price elasticity result was clearly enigmatic, although they also generated some useful results on the demand effects of income vs. education, as well as modest early results on quality (program mix). This work is further discussed below regarding those issues, as well as in the concluding summary regarding the effects of using more sophisticated econometric techniques. The somewhat different simultaneous model developed by Luksetich and Lange for orchestras (1995), also does not cite Moore (1966) although reflecting some of its features. Krebs and Pommerehne (1995) cite Moore (1966), and test three hypotheses about the behavior of arts consumers, public donors (via decisions made by bureaucrats and politicians), and theater managers, but estimate equations for arts visitors per capita, real government subsidies, and the quality of performances (i.e. share of popular works) using standard OLS to estimate linear equations.

This paper, which reflects the Moore (1966) concern about the potential understatement in the income elasticity of demand caused by time costs, as well as by the apparent practical appropriateness of using single equation estimation even in the face of potential simultaneity problems, continues to be among the most influential in the arts demand literature. This is especially true when combined with the expanded commentary about arts demand estimation methodology in the closely related Throsby and Withers (1979, chapters 3 and 7), which also reported results derived from the same modeling using Australian data. As with Moore (1966), it was motivated by a question beyond the mere mechanics of demand estimation: Could the financial strains of the performing arts identified by Baumol and Bowen (1966) be overcome by growing prosperity in the overall economy?[85] Economic growth creates two well-known but competing effects: (1) rising consumer incomes that should increase the demand for all normal goods, and provide an even greater demand shift for luxury goods with income elasticities above unity; and (2) an increase in the price of time spent in consumption that would create incentives to substitute away from especially time-intensive activities.[86]

The basic model is a straightforward application of basic economic theory postulating quantity demanded as a function of relative prices and income. It is adjusted to reflect the realities of using aggregated data applicable to the entire performing arts (theater, opera, ballet, modern dance, symphony concerts and chamber recitals) for the period 1929-1973 (largely from the U.S. *Survey of Current Business* along with basic wage, employment, income distribution, and price index data from *Historical Statistics of the United States*, Series D626). Hence, the general estimating equation, defined for all time periods t, is:

$$(4) \qquad (Q / Pop) = f(P_A, P_S, I, D)$$

where Q/Pop is the number of attendances per capita in the population, the P terms are the price of attendance and the price of substitutes respectively, I is income, and D is a measure of the distribution of income (defined to increase with inequality favoring the wealthy). Expected partial derivatives are positive for all variables except "own price." Withers' normalization of the attendance dependent variable by dividing by population became conventional in many arts demand studies.

Withers' critical contribution was to adapt the Owen (1969) approach to adjusting hourly wage rates by the unemployment rate so as to better measure "leisure price," and then utilize the Becker (1965) concept of "full income" (defined over all available hours, not just working hours) so as to impute leisure time as part of this full income, while incorporating the price of leisure into the

[85] This issue was also addressed in the section 2.3 discussion of possible changes in audience overlap behavior over time, and the possible effects of changing overall population demographics on performing arts audiences (linked to the so-called Cwi hypothesis).

[86] The classic references to these important concepts are Becker (1965) and Linder (1970), although Withers cites Owen (1969) as the inspiration for the method of separating pure income from leisure price effects in work-leisure choice models. As noted by Withers (1980, fn. 2), Baumol (1973) later addressed these competing effects and recognized their importance to his unbalanced growth model.

consumer price index deflator. This generates the alternative "time allocation" estimating model defined for all time periods t:

(5) $(Q/Pop) = f(P_A, P_S, P_L, F, D)$

with the new variables P_L defined as the price of leisure, and F as full income. In turn, those two variables are defined as:

(6) $P_L = w(1 - UR)$, where w is the hourly wage rate and UR is the unemployment rate, and full income is the standard Becker formulation:

(7) $F = T_C P_L + T_W w + Y$, with T_C and T_W defined as hours of consumption and hours of work $(1 - T_C)$ respectively, and Y defined as property income. Furthermore, the adjusted price index FPI is derived as:

(8) $FPI = k(CPI) + (1 - k) PLI$, where CPI is the standard consumer price index, PLI is the "leisure price index" and k is the weight of non-leisure income in full income. The expected signs on the first partial derivatives in equation (2) are the same as in the non-time allocation model of equation (1) for own price, substitute price and income distribution (D), and negative for the two new leisure price variable (P_L), while positive for the full income variable (F). The arts are considered *a priori* to be a "superior time-intensive good" in this formulation.

Withers utilizes single equation estimation, justified in part by the Moore (1966) demonstration that two-stage least squares tests had almost no effect on the results compared to single equation estimation, but also due to his belief that the performing arts market is inherently recursive in structure, with price in one time period affecting attendance in that same period, but any supply of new performances having an observable effect no earlier than the next time period due to the "advance planning and announcement of production and seasons and their prices that is typically required in this industry" (Withers, 1980, p. 737).[87] Thus, ordinary least squares is used with the double-log transformation to generate direct elasticity estimates from the coefficients (and also due to prior econometric evidence that this form is preferable for non-necessities in single good estimation, pp. 737-738).

Withers also emphasizes the use of real rather than nominal value variables to avoid money

[87] As discussed above in part 2.3 in the context of assessing the debate about arts booms, Heilbrun (1984, 1996) stressed the difficulties in smoothly increasing the quantity supplied of arts services and emphasized the role that periodic supply shifts can play in later stimulating observed increases in arts attendance. However, those observations are never linked in the econometric literature to the issue of whether to use single or simultaneous equation methods. In addition to the regular citation of Withers (1980) to justify single equation estimation, it is sometimes noted that Houthhakker and Taylor (1970) used single equation models in their static-adjustment estimation of expenditure functions for theater and opera (as part of their more general analysis of consumer demand in the United States), which while incorporating various lag structures into the analysis did not feel compelled to adjust for any simultaneity problems.

illusion and to impose a homogeneity constraint, and cites the use of per-capita terms as necessary to "neutralize changes of scale in the population" in order to "examine allocation of the average budget" (p. 738). In order to adjust for the aggregation problem that this creates, the income distribution variable D is important (measured as either factor share or Gini coefficient), and also allows for the testing of the notion that greater equality is "bad" for arts demand. Four other features in the Withers estimation are notable: (1) to reflect the possibility of "habit persistence" and only partial adjustment to change within any one time period, as suggested by Houthakker and Taylor (1970), both the "conventional" and the time-allocation estimation models are adjusted to incorporate a lagged dependent variable; (2) in the face of finding no "convincing" way to incorporate dynamic quality changes in the performing arts, the possibility of unexplained variance and coefficient bias is recognized, although possibly limited to the extent that "performance quality is predominately determined by innate performer ability" (p. 738); (3) to adjust for possible unexplained taste changes over time, estimation is done over the largely pre-World War II period 1929-1948 and the post-war period 1949-1973, as well as for the integrated period 1929-1973; and (4) given the aggregative nature of the data, the measure of the price of substitutes was especially problematic; the choice of the "reading and recreation component of the consumer price index" (available only from 1935; for 1929-1934 estimates from Owen (1969) were used) also was influential in many later arts demand studies.

Table 12 reports the most important results for the three time period equations estimated with both the conventional model and the time allocation model (minor variables and statistics are omitted). The dependent variable is the performing arts attendance rate (i.e. attendance divided by the population), with t-statistics cited below the coefficients. The consumer price index deflator is applicable to the conventional model, while the full price index deflator applies to the time allocation model. Income in the conventional model is personal disposable income per capita (PDI). The more complex full income in the time allocation model is the sum of PDI and "per capita leisure income," constructed by using the average weekly working hours from historical data and assuming that personal maintenance time is fixed at 80 hours per week (with the remainder of weekly hours spent on consumption, defined as a weighted average for those in and out of the labor force). While income distribution was defined using Gini coefficients in other regressions (not reported by Withers), that "D" variable is defined in Table 12 as the wage and salary share in of national income (so that higher values indicate <u>less</u> inequality in income distribution). Price and income coefficients are elasticities.

There are two broad reasons for the popularity of these results and their frequent citation by cultural economists: (1) the largely successful decomposition of the effect of rising income in the time allocation model into a relatively high "full-income" effect offset by a smaller real leisure price effect is consistent with *a priori* expectations that the arts can indeed be considered luxury goods that are time-intensive in consumption; (2) the inelastic (less than one in absolute value) price elasticities in the more structurally sound time intensive model (which increase to approximately unity or only modestly elastic in the conventional model) are also consistent with the *a priori* notion that the performing arts are an "acquired taste" that require sufficient commitments of unique investment in human capital to fully appreciate, arguably making other forms of entertainment relatively poor substitutes. Of course, it must

Table 12
Withers (1966) Results for Performing Arts Demand (United States, 1929-1973)

	Price	Income	Full In	Leisure P	Sub P	In Dist	Lag DV
1929-73 Conventional	-0.90 (-6.44)	1.08 (9.01)			0.68 (2.03)	0.11 (0.27)	0.19 (2.16)
1929-73 Time Allocation	-0.67 (-4.60)		2.74 (2.30)	-1.61 (-1.45)	1.06 (2.52)	-0.12 (-0.27)	0.31 (3.07)
1929-48 Conventional	-1.07 (-2.71)	0.64 (3.71)			0.80 (1.70)	-0.63 (1.30)	0.41 (3.24)
1929-48 Time Allocation	-0.62 (-2.16)		1.43 (1.97)	-0.59 (-1.07)	0.62 (1.94)	0.16 (0.29)	0.41 (5.21)
1949-73 Conventional	-1.19 (-6.38)	1.55 (7.16)			1.25 (1.48)	-0.59 (0.77)	0.19 (1.26)
1949-73 Time Allocation	-0.65 (-2.35)		2.78 (1.46)	-1.03 (-1.09)	1.35 (1.50)	-1.15 (-1.08)	0.08 (0.27)

Note: The equation order and variable labels are modified from Withers Table 1 to facilitate comparison of conventional and time allocation results. Constant term coefficients are not reported above, nor are the results of the "depression dummy," the auto-regression parameters, or summary statistics. R^2 is exceedingly high in all equations (.97 and above for both versions of the full period and pre-war period equations, and .94 and .86 in the conventional and time allocation estimations of the post-war period equations. The results are adjusted for first-order serial correlation using the Gauss-Newton algorithm (Withers, 1980, p. 739).
again be emphasized that these price elasticities are applicable to an extremely aggregated measure of the performing arts, and do not apply to specific organizations in specific product and geographic markets, nor does their interpretation in Withers (1980) reflect any sensitivity to the issue of the level of prices at which such "industry-wide" elasticities are estimated (see part 3.1.2 above).

Interestingly, perhaps because the use of the reading and recreation component of the CPI as the measure of the price of substitutes ("Sub P") has often been viewed as primarily a tolerable concession to data limitations (spawning similar measures in other studies), the cross-price elasticity evidence has not typically been stressed. This is notable since, despite the limitations of that price measure, the magnitudes of those positive cross-price elasticity estimates (although with only modest t-statistics) are generally higher (ranging from 0.62 to 1.35 in the time allocation model) than the magnitude of the cross-price elasticities estimated by the perennially cited study by Gapinski (1986). Of course, although Gapinski's cross-price elasticities (when viewed collectively by art form) were generally no higher than 0.53 for symphony and as low as 0.12 for theater, his data were much more disaggregated than those used by Withers (1980) so that he was able to also estimate cross-price elasticities faced by individual arts organizations (three of which were indeed quite high), and the substitute prices were much better defined as the prices charged by the other art forms, although in the case of the individual organizations, not the prices charged by the other organizations within the same art form (see 3.2.4

below).[88] These features of the Gapinski (1986) results, along with the fact that the primary purpose of that study was to address the degree of art form substitutability, while Withers (1980) was primarily focused on clarifying the income effects of arts demand, explain the inattention paid to the cross-price elasticity results in the latter study.

Another major feature of the Withers (1980) study that has been relatively ignored is his summary conclusion that his results potentially weaken the case of government support of the performing arts on the grounds of financial distress. That is, the high income elasticities only partially offset by the elasticity of the price of leisure in the time allocation model (and in fact the modestly high "unadjusted" income elasticity of 1.55 in the conventional model for the most recent time period), when combined with the relatively low price elasticities of demand, suggested to Withers that "the potential for continued growth on private market support for the performing arts should be recognized" (p. 742). It is ironic that this conclusion would be downplayed inasmuch as the very title of his paper announces his interest in exploring the unbalanced growth issue in the performing arts. On the other hand, any possible optimism for the future of the performing arts resulting from Withers' findings must indeed be tempered by: (1) the confirmation that a higher price of leisure does indeed complicate the boost that rising incomes can provide to arts demand suggests that continued increases in the price of leisure combined with a potential widening disparity between the time-intensiveness of the live performing arts versus other substitute forms of entertainment may well lead to stagnating private demand for the performing arts (as generally evidenced in the data examined above in 2.3); and (2) a more sober recognition that low price elasticities of demand at the national "industry" level may have little relationship to the price elasticities actually faced in localized markets by individual arts organizations (see fn. 90 below), and at best, a recognition that such low price elasticities may merely suggest that arts organizations might be able to raise revenues by increasing ticket prices above current levels until they move into the price elastic range of their demand curves, again moderates the degree of optimism that these results can generate.[89]

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[88] This aspect of the Gapinski (1986) results can easily be missed. For example, in an otherwise enlightening overview of the methodological issues involved in defining substitute goods and services for cinema, Fernández Blanco and Baños-Pino (1997) observe that Gapinski "shows that the best substitute for a theater play is not a film, but a different theater play" (pp. 62-63). In fact, the substitute price for the two theaters in the Gapinski database is the average of prices of opera, symphony and dance only (Gapinski, 1986, p. 21).

[89] Another feature of the Withers results that is sometimes forgotten is that when his model was applied to both Australian and Canadian data in Throsby and Withers (1979), the results were not as strong statistically. In the Australian case, while the ticket price elasticities were largely consistent with the American results, no significant income effect was found using either the conventional or the time allocation model (pp. 115-117). While Throsby and Withers attribute some of these problems to weaknesses in their Australian data, it is interesting that those data are at least less aggregated than in the U.S. case (i.e. applying to seven major professional performance companies, although over a shorter time period of 1964-1974; p. 115). Any degree of freedom and related problems were even more severe in the Canadian data, and the model could not be estimated in that case at all (Throsby and Withers, 1979, p. 112).

Despite the frequent citation of the Withers (1980) analysis of the decomposition of the income effect, it has spawned almost no direct efforts to replicate the results, further improve the model, or apply the model to better data.[90] Nevertheless, it is common to rationalize estimated low or statistically insignificant standard income elasticities by referring back to the Withers (or less frequently the more extended Throsby and Withers, 1979) analysis, and also to explain in part any evidence for a stronger estimated effect of education relative to income as a result of the conflicting forces associated with changes in income (see 3.2.2 below).

However, Ekelund and Ritenour (1999) represents a modest attempt to focus on this problem and isolate the effect of the time costs on U.S. symphony concert demand using a less aggregated unit of analysis than Withers, although still an aggregation of anonymous individual orchestra data as supplied by the American Symphony Orchestra League (ASOL) for 1973 to 1992 as supplemented by other data sources.[91] They estimate a single linear OLS equation, traditionally citing both Moore 1966 and Withers 1980 as justification for using a recursive model, which they suggest may be even more justified for orchestras than for Broadway (admirably, they also independently test for possible simultaneity bias and find none in their data). They regress annual per capita symphony orchestra concert attendance on ticket price (annual earned income divided by annual attendance), the price of audio recordings (their price of substitutes, calculated similarly as total annual revenues divided by recordings sold), annual real disposable income, and their key variable, the cost of time (as measured by the annual average real hourly wage rate). Only the coefficient on the substitute price variable behaves poorly (negative in sign rather than positive, and significant at only the 0.10 level). The own price coefficient is negative and strongly statistically significant (although low in magnitude consistent

[90] Although on occasion, a study will include some variable paying homage to Withers (1980), but never in the context of a formal time allocation model that attempts to separate pure income and leisure price effects. For example, Corning and Levy (2002) include "leisure" defined as the construction industry wage rate multiplied by (1 - unemployment rate) in California along with as many as 33 other variables in their conditional maximum likelihood estimates for three different Southern California theater locations. Perhaps unsurprisingly, it is negative but not statistically significant in two equations, and significant at the 0.05 level, but perversely positive, in the third equation. They explain that the construction industry wage the only such variable available on monthly basis (Corning and Levy, 2002, note 4, p. 234).

[91] Ekelund and Ritenour acknowledge this aggregation problem by noting that results may be different if city or SMSA data were to be used for specific orchestras. As direct evidence of this prospect, they cite an anonymous reader whose own analysis of panel data for five different U.S. orchestras in five different cities found positive not negative effects of the wage variable (the measure of the opportunity cost of time), but with only marginal statistical significance, as well as no economic or statistical significance from the income variable - both results at odds with those reported by Ekelund and Ritenour using aggregated orchestra data (see their fn. 12, p. 897). While the authors note that such intercity tests would also require inclusion of independent variables beyond income and the wage rate to account for potentially significant intercity differences (including substitutes uniquely available to a particular city or region), they concede the potential importance of such alternative tests of the "Becker time cost hypothesis"(their fn. 12).

with a low ticket price elasticity of demand), while income has a positive effect on attendance per capita (but with a normalized coefficient suggesting less than unit elasticity) and the wage rate (value of time) has a negative coefficient (significant at the 0.05 level).

Despite its modeling limitations and remaining aggregation problems (fn. 91), the Ekelund and Ritenour (1999) results are consistent with the fundamental idea that any positive income effect on arts demand (which is already smaller in their study than in Withers, and not comparable to the Withers full income concept) will be partially counterbalanced by the time intensive nature of live performances and the opportunity cost of that time. They are duly cautious in evaluating their findings, but interestingly tend to stress the threats to the arts resulting from their results in contrast to the more optimistic assessment provided by Withers (1980).

3. Luksetich and Lange: "A Simultaneous Model of Nonprofit Symphony Orchestra Behavior" (1995)

As with Moore (1966) and Withers (1980), Lukestich and Lange (1995) had a broader purpose for their research than just estimating demand functions. They wanted to test various hypotheses about the motivations and objectives of non-profit performing arts enterprises (using orchestras as an example based on extensive data made available by the ASOL) drawing heavily on Hansmann (1980, 1981) for theoretical inspiration. They had previously employed two-stage least squares methods to estimate orchestra demand in Lange and Luksetich (1984), first estimating their ticket price variable as a function of the exogenous variables in both a demand and a supply equation prior to inserting it into their second stage demand equations for three different orchestra sizes.[92] Their key findings in (1984) were: (1) price elasticities (evaluated at the means) vary by orchestra size, becoming more elastic as the size of the orchestra falls, with major orchestra demand quite inelastic and metro orchestra demand modestly elastic (urban/community orchestra demand was modestly elastic but not statistically significant); (2) the price elasticities became less elastic with the inclusion of a donor price variable (measured as total donations divided by attendance), although the donor price elasticities themselves were not statistically significant (negative and no higher than -0.212 in value); (3) their total sample price elasticity estimate of about -0.48 both with and without donor price was notably close to estimates from the major prior studies; and (4) the authors conclude that "in general," when comparing the OLS and the 2SLS results, there is support for the use of the 2SLS approach and the elasticities of the non-price determinants were stable regardless of procedure.[93]

The superior database for the 1995 paper allowed for a more thorough exploration of the relationship between factors under managerial control and various orchestra performance measures,

[92] A related paper (Lange et al., 1986) confirmed that equations for orchestras of different size and classification should be estimated separately; see also Luksetich and Lange (1995, p. 52).

[93] However, the case for the superiority of the more complex approach is not overwhelming. The authors note that the estimated equations of "price" from the single-equation estimation of 2SLS varied widely regarding the adjusted R^2 results across the orchestra sub-samples, possibly suggesting that the instrument price in the second stage is not necessary because the firms are not price takers so that no supply curve exists (Lange and Luksetich, 1984, p. 43).

which they modeled as a six-equation system with attendance, average price, administrative expenses, orchestra quality (using non-administrative orchestra spending as a proxy, which is an expansion of the "wages" variable they had used in 1984), number of concerts, and donations simultaneously determined. The model is estimated using two-stage least squares regression with the second stage estimated using pooled cross-section, time-series techniques with estimates corrected for heteroskedasticity and serial correlation. Of particular interest are their observations about the unique aspects of the industry that must be incorporated into the analysis (pp. 52-53): (1) After noting that a standard market clearing equilibrium constraint is not helpful, they contrast orchestral production measured as concerts (specifically, the total number of concerts in the home metropolitan area divided by the metro area or county population) with the actual consumption of cultural experiences, measured as actual attendance(specifically, total home attendance divided by the home metropolitan area or county population);[94] (2) Since orchestras rely on donated revenue as well as earned ticket revenue, they may actively try to encourage "voluntary price discrimination" by generating a pricing strategy that is not focused on the ticket market alone; furthermore the reaction of patrons regarding their donor decisions may be influenced by the ticket prices they pay, making a "total per performance market clearing price" impossible to compute; (3) The equation estimating the number of concerts should not be viewed as a supply equation given the local market power that individual orchestras are likely to have; hence a well-defined supply curve does not exist and cannot be estimated; (4) However, since orchestral managers may well have an objective of maximizing attendance, the number of concerts directly affects the total availability of seating for orchestral services; and (5) Therefore, their econometric model includes a partitioned set of jointly determined variables, distinguishing variables under the control of management (ticket prices, the number of concerts, performance quality, and administrative expenses) from the simultaneously determined variables under the control of consumers (concert attendance and donations).

Because Luksetich and Lange (1995) is perhaps the best example of estimating arts demand as part of a multi-equation simultaneous equation system using two-stage least squares estimation techniques, and due to the implications of the findings, their empirical results are reported in detail.[95]

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[94] While one implication of this distinction is to avoid having the same dependent variable in their demand equation as in their concert production equation, it is also potentially consistent with the separation of production decisions and consumption decisions that was important in justifying single-equation estimation of arts demand equations due to an absence of simultaneity bias. By viewing the provision of concerts as no more than the "opportunity to consume cultural experiences" (Luksetich and Lange, 1995, p. 52), they come close to suggesting a recursive rather than the simultaneous process that they actually propose. However, as seen with the listed characteristic (5) below, they reject a recursive process by effectively complying with the spirit of the frequent characterization of live performances (in sports as well as the arts) as creating the simultaneous production and consumption of the "experience" (in contrast to a painter whose work is created at a different time than it is viewed), and further add the decision to make donations as also simultaneously determined.

[95] The most comparable study is Jenkins and Austen-Smith (1987), who applied two-stage least squares regression analysis to their five equation system using English provincial theater data (price, program mix, national grants, local grants, and demand), although also reporting OLS results for comparison. As noted previously, their estimated price elasticity was perversely positive and statistically significant, and was explained as likely to reflect quality perceptions. Their results were

To appreciate the full specification of their model, Table 13 reports the six equation estimation results for the major orchestra case (27 orchestras over the eight year period 1979-1986, yielding 216 pooled observations). Since the double-log specification was not used, elasticities were derived at the mean values (reported after the table). The same equations were also estimated for the 11 metropolitan orchestras in their sample and for the 15 "small market" (classified in their 1984 study as urban/community orchestras). Elasticities for those orchestras are also discussed.

In addition to the interesting specification of the independent variables in each of their equations (a surprising omission in the demand equation is any measure of regional educational level), the most important findings relate to the low price elasticities of demand for each orchestral group. While this is a familiar result with aggregated data (although here at least segmented by orchestra size), it has especially interesting implications for orchestral full income maximizing (ticket plus donation) pricing strategies and for the interpretation of price elasticity results when arts and sports organizations have multiple interrelated revenue sources (part 3.1.2 above).

Table 13
Simultaneous Equation System Results for Major Orchestras
(Adapted from Luksetich and Lange, 1995, Table II)

Dep. Vars:	Attendance	Price	Admin Exp	Quality	Concerts	Gifts
Ind. Vars.:						
Price	-7.01 (3.85)		173 (3.01)	- 126 (0.26)	-0.1E2 (2.17)	-50 (4.66)
Quality	- 0.8E-3 (2.58)	0.1E-3 (4.56)	0.06 (4.70)		-0.3E-7 (0.16)	-.2E-2 (2.14)
Concerts	379 (4.62)	-7.59 (2.63)	-5842 (2.41)	-53706 (3.59)		
Gifts		0.5E-2 (4.27)	1.13 (1.04)	0.47 (0.07)	0.2E-4 (2.09)	

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also of interest regarding income and education elasticities as discussed below (part 3.2.2). Kelejian and Lawrence (1980) failed to implement their elaborate seven equation simultaneous system equation model, and reported only one equation estimated using standard OLS techniques. Other important multiple equation studies such as Gapinski (1986) and Pommerehne and Kirchgassner (1987) do not use simultaneous equation estimation techniques. Krebs and Pommerehne (1995) also estimate their three equations with OLS, but do use instrumental variables to adjust for endogeneity in their theater quality equation (and lagged endogenous variables in the demand, quality, and public subsidies equations).

Admin.		-0.3E-3 (1.50)		4.69 (8.74)	0.3E-6 (0.26)	-0.03 (3.32)
Attendance						-2.06 (4.26)
Pop. 18-24	-20 (3.24)					
Pop. 25-34	10 (2.36)					
Pop. 35-49	-11 (2.36)					
Pop. 50 +	2 (1.46)					
Income	- 0.2E-3 (0.19)					0.1E-2 (0.53)
Develop.						1.20 (8.89)
Advertise.	0.05 (2.42)					
Players					-0.3E-2 (10.50)	
% Nat. Pop.		32 (2.07)		136190 (1.87)	-0.49 (3.61)	
Ind. Buy. Pow.			362 (2.73)			
Radio TV Rec.				-1941 (1.32)		
Guests				2113 (1.74)		
Grants Yes	0.07 (5.90)	-0.1E-2 (2.47)	- 0.05 (0.10)	4.16 (1.38)	0.4E-5 (0.07)	0.17 (4.30)
Grants No	0.8E-2 (0.92)	-0.2E-2 (8.29)	1.54 (6.62)	-0.22 (0.11)	-0.2E-4 (2.82)	-0.06 (2.02)
Seat Capacity		-0.06 (2.26)				

Gift Price						-1128 (4.28)
Fed. Deduct.						-34 (1.22)
Fed Tx Ch. 82						95 (6.78)
Fed Tx Ch. 86						138 (6.10)
Dev./Gift (t-1)						47 (0.76)
Constant	382 (3.11)	3.26 (5.65)	1035 (2.47)	16069 (4.39)	0.36 (14.00)	1922 (4.77)
Buse R^2	.66	.62	.73	.71	.82	.76

Notes: Absolute values of t-statistics are in parentheses. Definitions of variables previously undefined: Price = income from home performances/total home attendance; Gifts = total fund raising income from individuals/metro area or county population; Income = median household income in home region; Advertise.= total advertising, promotion and marketing expense/home region population; Develop.= total development and fund-raising expenses/home region population; Players = total numbers of musicians regularly under contract; % Nat. Pop.= Home region population/national population; Ind. Buy. Pow.= index of local market buying power; Radio TV Rec.= Dummy variable = 1 if orchestra had radio/TV concerts or recording sessions; Guests = Dummy variable = 1 if orchestra spent more than 10 percent of artistic expenses on guest conductors and/or artists; Grants Yes = government and foundation grants requiring services/home region population; Grants No = same as Grants Yes, but not requiring services; Seat capacity = seating capacity for regular subscription series per home region population; Gift price = (1- highest state marginal tax rate); Fed. Deduct.= Dummy variable = 1 if federal income taxes are deductible from state taxes; Fed. Tx Ch. 82 = Dummy variable = 1 for federal income tax changes imposed in 1982 and for later years; Fed. Tx Ch. 86 = Dummy variable = 1 for federal income tax changes in 1986; Dev./Gift (t-1) = Develop./Gifts lagged one year. Values in real terms; 1982 = 100.

Regarding the individual components of the demand equation, ticket price performs well, but with a price elasticity (when evaluated at the mean price) that is soundly inelastic at -0.33 (p. 56). Surprisingly, quality has a negative effect on per capita attendance (and with a reasonable t-statistic), a result that cannot easily be explained away inasmuch as measuring quality by artistic personnel and total concert production expenses per concert is not an unreasonable proxy (although less direct a measure than the ones used by, e.g. Throsby (1990); see 3.2.5). However, production and artistic expenses (and related measures) were shown by Tobias (2004) to be a less reliable (but not negative) predictor of *expert* opinions regarding the quality of ensembles in theater than in ballet and opera (no orchestra results were reported), and all such spending by all art forms exhibited significant diminishing marginal returns. So the adequacy of this proxy remains unconfirmed (even assuming that the public were to share such expert opinion). The result that the number of concerts per capita in the region is a strong predictor of regional attendance per capita is consistent with previously cited

arguments that variations in the sheer availability of artistic resources is critical to explaining attendance variations (Heilbrun, 1984, 1996; Gold, 1980; Khakee and Nilsson, 1980), but in a model expressly designed to correct for simultaneity bias, it is surprising that attendance does not also appear as an independent variable in the concert equation.

Consistent with earlier discussions of the frequently enigmatic behavior of age variables in descriptive audience composition and participation studies, the percent of the regional population that is youngest performs as expected (strongly negative), but the next youngest group (age 25-34) has a positive effect on per capita attendance while the percentage of those age 35-49 has a nearly identical opposite negative effect. Furthermore, the oldest group has only a weakly positive effect on regional orchestra attendance. The familiar finding that income (at least when not divorced from the opportunity cost of time) often exerts only a weakly positive effect on attendance, *ceteris paribus*, appears here as well, and is perhaps especially noteworthy given the absence of the additional multicollinearity problem that would have been created with an education variable.

Finally, some variables that are rarely incorporated into arts demand equations suggest that such omissions may introduce specification errors when omitted. Conditional grants ("Grants Yes") have positive effects on attendance (and a t-statistic of nearly 6.0), although unrestricted grants ("Grants No") has no real effect. On the other hand, total advertising, promotion and marketing expense ("Advertise.") appears to be economically significant, but when translated into elasticity terms is only .06, a result the authors suggest is a reflection of the limited size of the market for symphony services (p. 63). But this explanation fails to address the enigma of why advertising should have such a small incremental effect when it would seem that more active advertising campaigns could be especially effective in at least modestly expanding exactly that kind of market.[96] While not addressed by the authors, the Buse R^2 (the more appropriate goodness-of-fit measure for generalized least squares models) of .66 for the demand equation is notably lower than the R^2 results reported by Withers (see the notes to Table 12 above), but that is an expected result of using the more complex simultaneous equation modeling compared to the standard single equation time-series approach.

Perhaps the most noteworthy results of the Luksetich and Lange (1995) analysis are those alluded to previously. Not only are the implied price elasticities low for all three orchestra types (in addition to the -0.33 for major orchestras, those elasticities are -0.42 for metro and -0.16 for small market orchestras), but the interactions between the ticket price and gifts per capita further clarify that orchestras have been following an excessively low price strategy. That is, even when adjusting for the possibility that higher ticket prices would induce arts patrons to partially reduce the donated portion of their "full price" of attendance, orchestras would generate more total income if they were to substantially increase average ticket prices (even ignoring more targeted price increases that might be justified in the audience could be further segmented). For major orchestras, the mean elasticity of gifts per capita to ticket price is -1.19 (p. 56). But, even considering that interaction between revenue sources, the authors calculate that the major orchestras could double the average ticket price from its

[96] And if such advertising were devoted in part to simply providing accurate information about programs and prices (including discount options), the problem Globerman (1978) cited of people generally having overstated perceptions of performing arts prices could be partially alleviated. See also 3.2.3 below.

current mean value in order to maximize ticket revenues, but more importantly, could increase ticket prices as much as 62 percent and still maximize the sum of ticket plus donated revenues (p. 58).

Of particular importance is their calculation that following such an average ticket price increase, the resulting average ticket price elasticity of demand at those higher prices is still well within the inelastic range at -0.65, fully consistent with the sports literature result that the optimal price for such "performance firms" is to actively price in the inelastic range of their demand curves, hence explaining the "paradox" of low price elasticities estimated in empirical demand studies.[97] Furthermore, since the objectives of non-profit arts organizations are arguably not limited to maximizing total revenues, or as Luksetich and Lange (p. 66) emphasize, "adopting a pricing policy aimed at encouraging donations from patrons," but may also include the more "traditional" public-spirited objective of encouraging the consumption of art and broadening its distribution, low price ticket strategies in the arts may be more fundamentally entrenched than even these results would suggest.[98]

Such conclusions cannot escape the limitation of having been derived from an aggregation of results over multiple orchestras (27 in the case of major orchestras) in differing local markets with various competitive factors incapable of being fully incorporated into demand analysis, along with price elasticities evaluated at essentially an average of an average (the average regional price derived from local prices that were themselves total revenues divided by attendance). Nevertheless, the results of this ambitious six-equation model are among the most provocative in the empirical arts demand literature.

3.2.2 *The Multicollinearity Problem: The Case of Education vs. Income*

The review of the non-econometric evidence and related analysis presented in Tables 6 and 7 demonstrated why the conventional wisdom developed that education is likely the most important single variable in explaining variations in performing arts demand. However, regression based models

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[97] Metro orchestras appear to have come closer to their optimal pricing strategy, requiring only about a 10 percent price increase to maximize combined ticket and donation revenues (the price elasticity of gifts is quite small for those orchestras), while small market orchestras are in the unique, but bizarre, position of being able to maximize ticket revenues with only 31 percent price increase, but would actually generate even higher combined ticket and gift revenues if they were to raise ticket prices by 57 percent (the result of having an estimated *positive* elasticity of gifts with respect to ticket prices). See Luksetich and Lange (1995, p. 60).

[98] Alan Peacock has reacted to the Luksetich and Lange (1995) implication that there is strong case for raising ticket prices by making the point that such a strategy would be inconsistent with the goal of encouraging arts participation (comments at a seminar presenting a very preliminary version of this chapter). Of course, O'Hagan (1996) observed that any such goal of broadening arts consumption beyond its traditionally elite audiences has seemingly failed and should be recognized as potentially insincere (see part 2.3 above). And Luksetich and Lange themselves primarily use their findings not to recommend ticket price increases, but to conclude that orchestras must have had more complex objectives than just to maximize total income, such as encouraging donations in their own right for whatever reason.

have not generally succeeded in strongly confirming this result. While the typically high correlations between education and other key independent variables (class, occupation, age, and even ticket prices in some models[99]) is a key reason, that multicollinearity problem is not the only complication.[100] Competing measures of education, distinctions between arts training and general education, and conceptual conflicts over the transmission mechanisms are also to blame.

In fact, the severity of multicollinearity varies greatly across arts demand studies. Jenkins and Austen-Smith (1987) lament the high standard errors for their social class, education and income variables, noting that when class alone is included in the demand equation along with ticket price and arts quality (defined as less esoteric programming) its coefficient is highly significant both economically and statistically (p. 169). On the other hand, Lewis and Seaman (2004) found that both education and income were the strongest predictors of arts attendance in their logit models (and that "parents' education" also performed quite well). And paradoxically, Abbé-Decarroux and Grin (1992) worry that the positive correlation between age and income will complicate their analysis of risk, age and arts attendance through the effect that higher prices of arts performances would independently have on the age structure of audiences (p. 136). Yet they later note that the covariance matrix (not reported) does not show any collinearity between respondent age and income, concluding that "the effect of age on attendance can therefore be considered as independent of income" (p. 138). In fact, since it is exceedingly rare for any arts demand study to actually report a covariance or correlation matrix (as in the case just cited), the magnitude of multicollinearity problems and how they vary using different measures of education and other variables is not easy to access.

As hinted in the finding that parents' education was also a strong positive predictor of arts

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[99] For example, due to the high correlation between incomes and prices over time, Goudriian and de Kam (1983) could not get statistically significant elasticity estimates for both in their time-series demand equations for theater and concerts without imposing a constraint on the income elasticity from their separately estimated cross-section equations. While they are aware of the weaknesses to that approach (citing Kuh and Meyer, 1957 on problems with extraneous estimates), they observe that "there was no alternative to get significant results"(p.39).

[100] While the positive correlation between education and income is most typically viewed as a challenge for empirical analysis, it sometimes strengthens arguments regarding controversial propositions in performing arts demand. For example, Throsby (2001, p. 116) supports his view that income elasticities are generally higher for the arts than for many other commodities by citing the "luxury nature and leisure content of some arts consumption" but also due to the "association of tastes with education and hence (at one remove) with income" (p. 116). Not only is this proposition questionable based on the quite mixed results regarding estimated income elasticities, but it seems to suggest that such high income elasticities depend, at least in part, on our inability to separate those effects empirically. Notably, it was the ability of Throsby and Withers (1979) and Withers (1980) to separate the value of time from the "pure income" effect that has provided the strongest evidence for the arts as a luxury good as commonly defined. Thus, the failure to be able to further differentiate that pure income effect from education would be an ironic "ally" in the case for the arts as a luxury good. Of course, from a purely forecasting perspective, any combination of causal factors that would make income a more reliable predictor of arts consumption would be welcomed in that different context.

attendance (Lewis and Seaman, 2004), the issue of how to measure education and whether to distinguish it from arts specific training at home, arts specific training in school, or just from past experience is highly problematic. As McCaughey (1989) asserts, "the reasons for the positive association of general educational attainment with participation in the arts are not fully understood; and how specifically arts education fits into this association is not clear" (p. 48). For example, Orend and Keegan (1996) and Relish (1997) stress the socialization or network effects of education in affecting arts participation rates, while Globerman and Book (1977) put education into a consumer production function model, although with only limited success in isolating a unique "consumption efficiency" effect on arts demand. It is also possible that education reduces search costs and generates more accurate perceptions of performing arts prices, a possible link to attendance established by Globerman (1978); see 3.2.3 below.

The Globerman and Book (1977) contribution is unique. While education is most commonly cited as merely a taste determining variable, cultural economists are perfectly comfortable with viewing education as one form of specific consumption capital affecting relative shadow prices, and hence the constraints, facing arts consumers. However, in part since either a taste or a relative price explanation can justify the inclusion of some type of education variable in an arts demand function (see below), no one else has actually tested for an explicit education consumption efficiency link to arts attendance. Because their model introduces important distinctions that are also useful to understanding the later discussion of learning-by-consuming versus rational addiction in arts demand (see 3.2.3), regardless of the eventual strength of their empirical results, it is worth describing in some detail.

Globerman and Book begin with a model directly adapted from the new theory of consumer behavior, with utility dependent upon a set of fundamental commodities Z_1 to Z_n, each produced according to a household production function $Z_i = f_i ((X_i , t_i) E)$, where X is a vector of purchased market goods combined with the consumer's own time inputs, t, applied to any one Z_i, subject to the productivity effects of the consumer's educational level E.[101] The key insight is that education can change both the relative (shadow) prices of the Z_i commodities through its impact on the marginal products of X and t in the production function, as well as changing consumer real incomes (although not limited to the expected effects on money incomes; see below). Therefore, education creates both a pure substitution effect and a real income effect on the demand for commodities. The demand for commodity Z_a (e.g., arts appreciation) is written:

[101] Although the frequency of referring to the constraint rather than the taste explanation markedly increased following Stigler and Becker (1977), Globerman and Book (1977) did not have access to that paper or to the West and McKee followup (1983). They cite instead three earlier foundation contributions to the consumer as producer model (Grossman, 1972; Michael, 1972; and Michael and Becker, 1973).

(9) $Z_a^d = d_a\,(Y/P,\ P_a / P)$

where the arguments are real income and the relative price of arts appreciation. Consequently, the effect of additional education on Z_a can be expressed as:

(10) $\tilde{Z}_a^d = \eta_a\,(\tilde{Y}_C) + \varepsilon_a\,(\tilde{P}_a - \tilde{P})$

where the superscript tildes are the percentage changes per unit of education, η_a and ε_a are the arts commodity's income and own price elasticity applied to the relative percentage change in the arts commodity price versus all other prices, and the Y_C term is the percentage change in "consumption income" (i.e. the value of the additional units of the commodity as a percentage of "full income," or wT, where T is the total time available for both working t_w and household production, $\Sigma\, t_i$ over all commodities) resulting from a unit increase in education. Globerman and Book (1977) warn that equation (10) abstracts from any effects of education on money income via increases in overall "market production efficiency" (see their note 7), but focuses instead on resulting increases in consumption income due to the productivity effect on time and market good inputs. This complicates the empirical testing of the household production model.

The consumption of arts appreciation Z_a cannot be observed, but arts attendance via ticket purchases can, of course, be measured and serves as the typical dependent variable in arts demand equations. Since arts performance attendance is one of the X market inputs in the household production consumer choice model, Globerman and Book (1977) must address the derived demand for X_a as it is affected by education, which they represent as:

(11) $X_a = (Z_a^d - MP_a) + W_{t\,a}\,(X_a - t_a)$

where all terms except W_{ta}, the production share of time, are expressed as percentage changes per unit of education (omitting the superscript ~ notation from (10)), and MP_a is the percentage change in the production of Z_a per unit of education. Assuming a homogenous production function and that more education does not affect the ratio of factor prices, the $(X_a - t_a)$ term in (11) can be rewritten as $\sigma\,(MP_{Xa} - MP_{ta})$, where σ is the elasticity of substitution in production, yielding what can be renamed as equation (11'). When equation (10) is substituted into equation (11') along with some rearrangement of terms, Globerman and Book obtain the full derived demand for X_a expression:

(12) $X_a = \eta_a\,Y_C - MP_a + \varepsilon_a\,(P_a - P) + W_{ta}\,\sigma\,(MP_{Xa} - MP_{ta})$

where all terms except η_a, ε_a and $W_{ta}\,\sigma$ are again expressed as percentage changes per unit of education (without the ~ notation from (10)). The first right-hand term in the gross increase in the demand for Z_a due to the effect of education on non-market real income; the second term is the change in the production of Z_a given initial input quantities; the third term captures the effect of "commodity bias," or the differential productivity effects of education on Z commodity relative prices; and the last term captures "factor bias" or the differential effect of education on the marginal products of the inputs in the Z_a production function.

Indicative of the complexity of empirically isolating a consumption productivity effect of education, Globerman and Book clarified a few more steps in moving from the theoretical to an empirical model (adapting Michael, 1972). Firstly, it is assumed that education raises the marginal productivity of each factor by the same percentage (i.e. factor neutrality), so that the last term in equation (12) is reduces to zero; and that education also raises the overall productivity of all Z production functions by the same percentage, so that the third term in (12) also reduces to zero. Secondly, since the overall change in consumption real income Y_C per unit of education is defined as the increase in the output of all Z commodities holding factor input levels constant, Y_C can be written as a function of Z expenditure shares S, and marginal products MP, across all Z goods

(13) $Y_C = \Sigma S_i (MP_i)$

with Y_C and MP continuing to be defined as percentage changes per unit of education. Finally, by again invoking the commodity neutrality assumption, the MP's are equal across all Z commodities, and since the sum of all expenditure shares must be 1, Globerman and Book (1977) get their usable version of equation (12) in terms of real consumption income and the Z_a income elasticity of demand, η_a:

(13) $X_a = Y_C (\eta_a - 1)$

with the following key predictions regarding how observed arts attendance X_a varies with the income elasticity of demand for Z_a: $X_z > 0, = 0$, or < 0 as that income elasticity η is $>0, = 0$, or <0.[102] That is, attendance at the live performing arts will be positively related to education via its unique consumption productivity effects if the income elasticity of the demand for the fundamental commodity arts appreciation, Z_a is greater than unity, *ceteris paribus*.

Globerman and Book test this key implication by estimating income-expenditure curves from cross-section data derived from audience surveys at a sample of 100 professional and semi-professional arts performances in Ontario over a three moth period in late 1973/early 1974. They recognize that in contrast to a population or participation survey, their audience survey need not be representative of the more general population (one of the modifications and extensions of their study that might have fruitfully been attempted). The Engel curve fitted to the data has the functional form:

(14) $X_{ij} = f_i (Y_{C\,i}, H_i, R_i, A_i, S_i, M_i)$

with the dependent variable defined as the number of times in the previous 12 month the i^{th} individual attended a live performance of the j^{th} art form (theater, classical music, dance, and opera), as well as two comparative forms of entertainment, movies and sports events. While the theoretical model calls for a dependent variable defined as expenditures, Globerman and Book feared that errors in respondent recall would be lessened if only frequency of attendance was required and not further details about

[102] Furthermore, the magnitude of the change in consumption income Y_C can be expressed as $\xi_{YcE} = \xi_{aE} / (\eta_a - 1)$, where the left-side term is the elasticity of consumption income with respect to education E, and ξ_{aE} is the elasticity of expenditure on the market good X_a with respect to education (see, Globerman and Book, 1977, p.20).

prices paid.

In going from the "consumption income" concept of the theoretical model to a measurable income measure, they wanted to use the individual's permanent income but were forced to rely upon the more typical current year income.[103] They use two measures of human capital: H_1 = number of years of formal education, and H_2 = a discrete binomial variable = 1 if the individual had taken arts or arts related courses. A dummy variable R = 1 for those living within metropolitan Toronto; A is the age of the respondent, included to control for other forms of human capital such as health or age specific taste differences.[104] Two other (0,1) control variables are included: S = 1 if male, and M = 1 if married (included largely to reflect their expectation that single people are more likely to attend dance and music events, and married people theater events). Finally, while equation (13) applies to the income elasticity of the commodity, Z_a, data limitations require that the income elasticity from the fitted demand curve applies to expenditure on the market good X_a.[105]

While it was important to fully describe how the education/consumption efficiency hypothesis can be tested (and to set the stage for related discussions in 3.2.3), the Globerman and Book (1977) empirical results can be streamlined since there is really only one critical point about those results in this context. Two equations were estimated (one using H_1 and one using H_2) for each of 6 types of performances (X_1 = theater, X_2 = dance, X_3 = music, X_4 = opera, X_5 = movies, X_6 = sports). The critical independent variables are those human capital measures (years of schooling H_1; and art specific training H_2), but even more importantly for the efficiency in production hypothesis, the elasticity results for income, Y, which must exceed one (based on equation (13)) in order for education to be viewed as making its contribution to increased arts attendance via a household consumption

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[103] To reduce any resulting downward bias in the estimated income elasticity coefficient, they excluded students and all respondents under age 16, as well as respondents from the lowest income categories (< $7,000 Cn). They also grouped the sample respondents by income class to average out the transitory component of income, but were forced to truncate the highest open-end income interval (they used the lower end boundary of $20,000 for this $20,000 and greater group). See Globerman and Book (1977, p. 22).

[104] While not referring to the mixed age results of the more descriptive non-econometric literature, their note 14 observation that the effect of age on arts attendance is "difficult to predict" since age can capture both positive human capital effects as well negative health effects, is apropos. Gray (2003) ignores the health complication, but cites age as likely to have a negative effect on arts participation due to a rising implicit opportunity cost of an evening out with age, countered by the positive effect of age on creating "additional consumption skills" (his Table 1, p. 358).

[105] The difficulty of ever obtaining data related to the more unmeasurable Z commodities is an inherent challenge to empirically applying the otherwise insightful household production model. But Globerman and Book cite Michael (1972) as showing that if each unit of the market good X is used exclusively in the production of one Z commodity, the income elasticity of the market good is equal to the weighted average of the income elasticities of the commodities which use that good, with the weights equal to the share expended on each commodity (see their note 18). Arts performance attendance X_a is the type of market good that can plausibly be viewed as applying only to one Z commodity, i.e. arts appreciation Z_a.

productivity effect.
All but one reported equation had very high adjusted R^2 (exceeding .831, with the sole exception the music equation using H_2 at .556, still high for cross-section data). As reported in Table 14 below, the estimated mean elasticities on the human capital variables were positive (and generally statistically significant at either 0.05 or 0.01), with the average for the four art forms being 0.726 for the years of formal schooling variable and 0.504 for the binary variable for arts specific training.

However, only the opera equations had estimated income elasticities modestly greater than one (1.052 with H_1 and 1.081 with H_2), and the overall arts average income elasticity estimated at the mean was 0.877 (it was an average of 0.86 in the movies and sports equations). Thus, despite the fact that this average income elasticity is higher than many that have been estimated (see Table 11, and 3.1.3), Globerman and Book interpret these results as "not particularly impressive support for the household production model" (p.25). However, they note the downward biases in the income elasticity coefficients that they could not fully avoid (see fn. 103 above), and the fact that (even as of 1977), there were other studies with income elasticities estimated to exceed 1.0 (and more since then; see Table 11).

Other complications that were noted above might also suggest that, while the estimations were not able to confirm the education consumption efficiency effect, it is likely to exist (Globerman and Book, pp. 27-29). For example, if education raises overall market productivity and money income, the resulting higher opportunity cost of time will induce some substitution away from time intensive arts activities and bias the income elasticity downward (an effect, of course, that was later clarified by Withers, 1980, in generating a pure income elasticity that was indeed higher than 1.0 even though the standard income elasticity was not statistically different from 1.0; see 3.2.1). The other theoretical complication that could hide the identity of the consumption efficiency effect in the arts is that education may not be commodity neutral (i.e., in fact, differentially affecting the productivity of competing Z commodities), and thus by changing the relative prices of different Z commodities cause some substitutions away from Z_a and hence reduce the derived demand for arts attendance input, X_a (also reducing the observed income elasticity of demand for arts attendance among the more highly educated). This is analogous to the fundamental distinction between absolute and comparative advantage in trade theory. Education may improve the consumption efficiency of arts appreciation Z_a by making arts attendance X_a significantly more productive, but be even more potent in increasing the marginal products of X and t in producing competing Z commodities. In summary, this analytically noteworthy attempt to clarify exactly how education affects arts demand may have ultimately generated only weak confirmation of the consumption efficiency phenomenon. But despite its being relatively ignored in the later literature, it clarified important complications in the modeling of arts demand that continue to be critical to properly interpreting the empirical results.

Regardless of the exact causal connection between education and arts consumption, the various classifications of formal schooling (e.g. high school, some college, graduate school) that are identified in audience and participation surveys (see Tables 1, 2, 6 and 9) are common measures of "education" in econometric studies. The specific way such formal education enters those equations depends on the data being used and the unit of analysis being studied. In what might be called "Type A" (aggregative) studies, the aggregate attendance or participation behavior of the population is known, but the data are not based on the attendance patterns of specific individuals with known personalized demand

determining characteristics.[106] The dependent variable is typically some version of attendance at specific arts organizations normalized by the regional population in which they are located (whether a time series case study or a pooled or cross-section study of some aggregate of such organizations). Consequently, the education independent variable must reflect the aggregative characteristics of the population in that region (e.g. "percent of the population with a college degree," or "median years of schooling," etc.). Type A studies come closest to estimating well-specified demand functions, since they are often capable of also incorporating key demand determinants such as ticket prices charged by specific organizations, prices of substitutes, and less commonly proxies for the quality of the organizations. However, Gapinski (1981) and Bajic (1983) contain only community demographic variables. While Goudriian and de Kam (1983) estimate a Type A time-series demand model with own price, substitute price, income and a community tax variable, they lacked comparable age or education data. But their cross-section data allowed estimation of income and education elasticities, and those results are reported in Table 14 (see "Type P" studies below).

The same measurement issues arise regarding income in Type A studies (i.e. "percent of the

[106] As usual, the variability in databases can create anomalies. For example, Bajic (1983) had access to subscriber lists (not audience survey data) for both the St. Lawrence Theatre and the Toronto Free Theatre. While this provided information on the residential location of individual subscribers and hence allowed the construction of an independent variable measuring commuting distance to the theaters, there was no personalized information on education or income - hence requiring the construction of an aggregated measure of education and income per "zone." See Table 14.

population earning above $30,000," or "per capita disposable income," etc.), but some localized measures of income are typically incorporated into those demand equations. Another complication is that measures of occupation are sometimes used instead of income. Since the average incomes in such occupational classifications differ in predictable ways, such variables are essentially proxies for income, but nevertheless complicate the interpretation of whether the results demonstrate that education is more or less powerful than income in determining arts attendance behavior. Wealth might also be a better measure than income, but as noted by Ekelund and Ritenour (1999; their fn. 4), it has not been a factor in arts demand studies due presumably to severe computational problems.[107]

Alternatively, in "Type P" (personalized) studies, the attendance or participation behavior of particular individuals can be matched to their unique demand-determining characteristics. Dependent variables can be continuous (e.g. "number of arts events attended," or "number of attendances") or binary (e.g. "1 if attended at least one time, 0 if did not attend at all"). In Type P studies a wider

[107] This is accurate, and measurement problems have also plagued the rare attempt to introduce permanent rather than transitory income (e.g., Globerman and Book, 1977, p. 22). However, Lévy-Garboua and Montmarquette (1996) are forced to resort to rather poor wealth proxies in the absence of income data (e.g. "owns more than one automobile;" "owns a microcomputer"). And the evaluations of popular music and classical music audiences, and sports versus arts audiences by Prieto-Rodríguez and Fernández-Blanco using bivariate probit estimation (both in 2000) are unique in introducing "other income" variables linked to wealth (i.e. two dummy variables = 1 if a survey respondent has property rents or yields from bonds and shares, respectively). The bonds and shares dummy was positive but not significant in both the popular and classical music equations of the music study, and was positive for music, and negative for live sports and cinema while also lacking significance in the sports study. By contrast, the property rents coefficients were uniformly positive across both studies, but only statistically significant for classical music. A social security benefits dummy variable was generally negative across all equations of both studies but only came close to significance in the cinema equation of the sports study (it also had a weak positive coefficient for classical music in the music study). The more successful aspects of these studies are discussed in 3.2.4.

variety of educational variables can be included beyond the usual formal education measures, and in fact, distinctions can be made between own education, parents' education (sometimes distinguished by gender), specific types of education (e.g. art training at home versus at school), or diverse measures of exposure to various art forms or practical training in those fields. Of course, in both types of studies, correlations between any of these education type variables can be high with variables other than income (or occupation), such as the age variable that concerned Abbé-Decarroux and Grin (1992). However, Type P studies may be especially prone to multicollinearity problems to the extent that they are capable of including a larger number of education type variables, which may themselves be highly correlated.

Type P studies are never capable of incorporating price variables (including any related to possible substitutes), or any variables that relate specifically to the types of available arts organizations or their quality. At best, a variable can be inserted such as "lives in city over 50,000" (Lewis and Seaman, 2004) to try to capture some of those localized "fixed effects." In this sense, Type P studies are not estimations of well-defined demand functions as economists conceive of them.

Table 14 below summarizes the econometric studies that include some measure of both education and income, sorted by type of study, definition of variables, results, and control variables. Among the most notable results are that Gapinski (1981) viewed his own elasticity estimates as only tentative, but paid homage to the Ford (1974, Vol. II) non-regression based findings (Table 7 above) by noting their general similarity to his results. More importantly, the overall results of the 12 studies provide relatively weak confirmation that education measures reliably outweigh income measures as determinants of arts demand. Only five of the studies (41.7 percent) find evidence for the dominance of education. Strong pro-education evidence is in Ganzeboom (1989) and Peterson et al. (2000). Gapinski (1981), Gray (2003), and Lewis and Seaman (2004) provide modestly strong evidence that education outweighs income, while two studies generate opposite results favoring income (Bajic,1983; Bonato et al.,1990). Although Globerman and Book (1977) focus on the separate issue of whether the role of education is consistent with the household production model, their estimated elasticities are higher for income than for education, providing some evidence against the education dominant hypothesis.

The remaining four studies yield ambiguous results. Goudriian and de Kam (1983) do not calculate education elasticities making direct comparisons difficult, but their t-statistics on the education variable are very high. Meanwhile their income elasticities are only high when age and education are dropped from the equations. Jenkins and Austen-Smith (1987) generate a higher education demand elasticity in their two-stage least squares equation but a lower elasticity relative to income using OLS. But in either case, the standard errors are quite high when both variables are included along with "social class" (i.e. the number of males in "English social class I") in the relevant region. The income coefficient in Dobson and West (1989) is negative, but the standard educational variable is also weak and statistically insignificant. Their strongest results are for two general education substitutes: childhood participation in non-school theater performances as opposed to school-related performances, as well as childhood theater participation rather than just exposure to the theater, both strongly influence adult theater attendance.[108] Finally, Abbé-Decarroux and Grin (1992) do not

[108] Dobson and West (1989) also provide relatively rare econometric evidence regarding the audience overlap issue (section 2.2 above), when they find that attendance at dance performances, but not at music or opera performances, strongly increases attendance at the theater. However, consistent

utilize a formal education variable, but find similar evidence to that of Dobson and West (1989) that "arts training" variables perform well (although their variables do not distinguish between home and school exposures). But they also find fairly strong evidence for the importance of income (although less strong than the arts training variables). Table 14 provides more information about these 12 studies that were summarized above..

Table 14
Econometric Evidence Regarding The Roles of Education versus Income

Type A Studies:	Education related	Results	Income	Results	Other Ind Vars
Gapinski 1981: (Estimates unstable, so results tentative, although "agreeing" with Ford (1974))	(1) % with at least 4 yrs. college (2) median years of education	Elasticity (2) at sample mean = 0.543	(1) % > $25K (2) mean inc. per fam member	Elasticity (2) at sample mean = 0.359	% > 61 or < 21 Median age SMSA pop.
Bajic 1983: (D.V. = # theater-goers in each of 2 Toronto theater zones deflated by # HH > $10K zone)	# of college graduates across 28 zones deflated by # HH >$10,000 each zone	Box-Cox Elasticity: 0.21 and 0.36 for 2 theaters	# of HH > $20,000 in each zone deflated by # HH/$10,000 each zone	Box-Cox Elasticity 0.84 and 0.50, 2 theaters	Distance in miles from subscriber residence to theater (Elast. - 0.43; -0.48
Jenkins & Austen-Smith 1987: (Edu and Inc elasticities low stat sign. when with "Class" variable)	# full-time students 15 or over in schools for theater sub-region	2SLS Elast. 1.079; OLS 0.065	Avg full-time <u>male</u> weekly income local county /same England	2SLS Elast 0.264; OLS 0.541	Ticket price Program mix Audience social class (E = 0.211)
Bonato et al. 1990: (Time-series study using Italian data 1964-1985)	# of holders of secondary school cert. or univ. degree per 100,000 pop.	Elast: - 0.09 0.12 - 0.40 none stat significant	Income per capita in real terms	Elast: 0.89 0.93 1.03 t- stats range 1.6 to 2.2	Real price Real movie pr. TV subscribers per pop. # Perfs./pop Tourist / pop
Type P Studies:					

with the generally ambiguous non-regression results, they explain this as the result of Atlanta dance companies often utilizing theater space, so that "physical familiarity" along with possible "advertising information" may partially explain this unique result (pp. 111-112). For broader overlap evidence, including regarding sports, see section 3.2.4.

Globerman & Book 1977: (4 P.A. forms + movies and sports; 2 equations each)	(1) # of yrs. edu or (2) 1 = arts or related courses	Avg arts elasticity (1) 0.726 (2) 0.504	Current yr. income	Avg. arts elasticity 0.877; movie & sport 0.86	Region Age Gender Marital status
Goudriian & de Kam 1983: (Cross-section only; time-series lacked income or education variables; estimates for Theater: Th, and Concerts: C)	# Total of yrs. of formal education of all household members	Elasticity not calculated; but t-stats > 11.3 for theater & concerts	Disposable household income	Elast. at mean Th: 0.382 but 0.105 w. ed & age. Elast C: 1.016 but 0.482 w. ed & age	Total of ages of all HH members Dependent Var = Aggregate attendance to Th + C / # HH members > 6 yrs old
Dobson & West 1989: (Study of theater attendance in Atlanta based on 406 returned questionnaires)	(1) 1 = child participation in school performs. 2 = child participation in non-school performs. (2) Level of education (3) Child "activity" in the theater (4) Child "exposure" (taken to) the theater (5) Type School	(1) strong + effect of non-school vs. school (2) + but not stat. significant (3) strong + effect (4) + but not strong (5) not stat. sig.	Level of family income codes from 1-5, with 1 > $50,000 and 5< $20,000	Stat sig but negative effect	Age Time of year Rural v Urban Perform night Type of play Theater size Gender Ethnicity Frequency of attendance at Dance, Music, Opera, Rock Concerts
Ganzeboom 1989: (Reports "full" sample results for U.S. and Hungary, and "urban" results for U.S., Hungary, Netherlands)	(1) Formal education level (2) Parents' education level	Urban standard coefficient (1) U.S. 0.23; NL 0.24; H 0.31 (2) insig.	(1) Log household income (2) Coded economic status of occupations	(1) U.S. 0.10; NL 0.05 not sig; H 0.12 (2) insig.	After formal education in importance: Cultural socialization Occup. culture status Age Urbanization

Abbé-Decarroux & Grin 1992: (Logit models of opera, concerts, and theater in Geneva)	No formal education variable. (1) "Experience" = 1 if exposed to live arts as child via parents or school (2) "Art"= 1 if studied art form	Both (1) and (2) strongly + and stat sig. in all equations except (1) for theater	Monthly personal pre-tax income	Positive . for all 3 forms; stat. sig. for opera and concerts	3 Age range dummy vars. Gender
Peterson et al. 2000: (Focus on age but extensive analysis of 7 art forms including art museum, jazz, and musical)	(1) Highest level of formal educat. coded 1-13, with 1 = 7th grade or less to 12 doctorate & 13 professional (2) Father educat., same coding	Complex results but (1) is generally strongest variable all eqns. (2) + and usual sig.	HH income coded 1-8 with 1 = $10,000 or less to 8 > $100,000	Often 2nd strongest var. for some age groups & art types; but can fall to 6th place	Age Gender Race Marital status # Children Health status Metro
Gray 2003: (Participation study using 1997 SPPA and logistic models)	(1) Education: 3 levels (2) Art/music lessons (3) Age as proxy for consumption skill; also $(Age)^2$	Varies across art forms: generally (1) + and strong vs. income; (2) + but weaker than (1); (3) mixed	Household income: 3 levels	Varies across art forms: generally rises with income but weaker than (1) educat.	Minor children Gender Race/ethnic Hours worked per week; also squared
Lewis & Seaman 2004: (Logit study of museum, dance and classical music 0,1 attendance focusing on sexual orientation and religion; data from 1993 and 1998 General Social Survey U.S.)	(1) Own education measured in years (2) Parents' education in years for the better educated parent	(1) Had highest standard odds ratio for all art forms (2) Strong + effect all equations	(1) Income in tens of thousands of 1993 dollars with dummy for top open-ended range or (2) Dummies for each income range	(1) 2nd highest standard odds ratio all eqns. (2) Had little effect on results	Lesbian, gay, bisexual 0,1 Age; $(age)^2$ Gender Marital status Children 0,1 City > 50,000 Religion Black & other minority Year 1998

3.2.3 *The Taste Cultivation Problem and Human Capital: Habit Formation, Learning-by-Consuming and Rational Addiction*

While certainly not limited to the arts, cultural economists have always stressed that current arts demand (whether for live performing arts services or the stock of tangible art works) is especially influenced by past arts exposure, and that inter-temporal dynamics should be incorporated into a well-specified demand model. Nevertheless, except for indirectly addressing this issue via the inclusion of age, education, or childhood exposure (e.g. Morrison and West, 1986) independent variables in part because they serve as proxies for "experience" in consuming the arts, explicit inclusion of lagged dependent variables as separate determinants has been relatively rare. Only Houthakker and Taylor (1970), Goudriian and de Kam (1983), Oteri and Trimarchi (1990), Krebs and Pommerehne (1995) and Urrutiaguer (2002) include a one-year lagged endogenous dependent variable, and in each case it was strongly positive and statistically significant.[109] Carson and Mobilia (1989) define the lag differently. Their much shorter weekly lagged dependent variable has negative effects on current attendance, a result they explain as capturing the effect of infrequent arts consumption such that very recent attendance actually reduces the likelihood of attending again in the current period (see fn. 71 above).

With a longer lagged dependent variable of even one year, what seems to be captured is not

[109] Krebs and Pommerehne attribute the difference between their estimated low short run price elasticity (-0.16) and the higher long run elasticity (-2.6) to the stronger impact of their one-year lagged attendance variable (actually mislabeled as a lagged quality variable their equation 1A, p. 26). They interpret this result, following Houthakker and Taylor (1970) as reflecting "habit formation," although their partial adjustment model (where consumers are assumed to partially adjust to long run equilibrium) is not identical to their predecessors' "stock adjustment" model (see Krebs and Pommerehne, p.25, and their note 25, p.30).

infrequent and discrete arts consumption patterns, but a proxy for the cumulative effect of some version of what might be called the cultivation of taste. What is not always appreciated is that there are multiple versions of this phenomenon, with each having somewhat different implications for our understanding of arts demand and for optimal arts marketing strategies.[110]

The most "passive" explanation for past consumption affecting current and future consumption is simple habit formation, the behavioral inertia so characteristic of much of human behavior (Houthakker and Taylor, 1970; Pollak, 1970; see fn. 110). If habit formation is the primary reason for the strong performance of lagged dependent variables in arts demand equations, arts managers should go to great lengths to introduce the arts to young audiences with regularly scheduled targeted programs to get them into the habit of attending, even independent of any particular human capital formation effects. In fact, the important role of specific consumption capital is closely associated with the third approach described below called rational addiction.

Another version of taste cultivation has become known as learning-by-consuming, in which consumers are characterized as uncertain about their utility functions but learn their own subjective preference structures through a process of consumption experiences generating either positive or

[110] Lévy-Garboua and Montmarquette (1996) emphasize the two most interesting reasons identified by Pollak (1970) for a distinction between long and short run demand functions, ignoring his more institutional "contractually fixed commitments" explanation (Pollak, p. 745). Thus, while Pollak originally did have a three-fold classification scheme (as is the case presented in the chapter discussion herein), only two approaches are cited by Lévy-Garboua and Montmarquette. They clarify the simple "habit forming" phenomenon identified by Pollak (his third case) as a "deterministic approach," by which any type of habit formation or the creation of consumption capital, whether myopic or farsighted, is considered an inevitable reality of the human condition (p. 28). This is contrasted with Pollak's second approach stressing the ignorance of consumers about their own preference orderings "outside the range of ...past consumption experience" who rely upon personal experience through "a time consuming learning process" (quotations from Pollak, p. 745). Lévy-Garboua and Montmarquette (1996) also cite two other antecedent related approaches (note 2), but seem to have been the first to actually use the phrase "learning-by-consuming."

negative feedback (Lévy-Garboua and Montmarquette, 1996; Brito and Barros, 2005; Ulibarri, 2005). Abbé-Decarroux and Grin (1992) present a "hybrid" type of learning-by-consuming model, in which consumers already have well-defined utility functions (with older consumers being especially risk averse), but poor knowledge about the product characteristics of different suppliers which can be clarified by positive and negative feedback from a kind of "lottery" of actual consumption. These models can have implications for the programmatic choices of arts managers (usually biased toward less esoteric and risky programming; e.g. Abbé-Decarroux and Grin, 1992). As described in some detail below, Globerman (1978) presents a search model that has some similarities to both passive habit formation and a broader interpretation of learning-by-consuming that relies upon a process of price discovery rather than taste discovery,

Finally, past consumption can positively influence present and future consumption through rational addiction (Stigler and Becker, 1977; McCain, 1979, 1981, 1995; Spinnewyn, 1981; West and McKee, 1983; Becker and Murphy, 1988; Villani, 1992; Cameron, 1999; Lévy-Garboua and Montmarquette, 2003). The key assumption here is consistent forward looking behavior where consumers maximize an intertemporal utility function and are willing to sacrifice current utility for future utility by making investments in human capital (either general education, or more targeted training). The opposite of myopic habit formation, this model actually requires the least of arts managers, who in the extreme need only maintain generally high quality standards so as to not endanger the perception that the arts are one of those goods capable of yielding future utility rewards resulting from sacrificing current consumption to invest in the creation of human capital capable of translating mere occupation of a seat in a performance hall into genuine artistic appreciation.

Houthakker and Taylor (1970) remains the classic "state-adjustment" dynamic model linked to habit formation, estimated using OLS as part of a comprehensive study of consumer demand in the United States (reporting results for 82 separate spending categories). While they also reported results for motion pictures and spectator sports, their estimated equation for "legitimate theater and opera" is often cited, both for the specific derived short run versus long run "relative price" elasticities (i.e., - 0.1827 and - 0.3109 respectively) as well as for their conclusion that while theater and opera are subject to habit formation, it "wears off quite rapidly" (p. 131). The theater and opera equation, with a per capita *expenditure* definition of the dependent variable is (absolute value of standard errors in parentheses):

$$(15) \quad q_t = \underset{(.0632)}{0.6057 q_{t-1}} + \underset{(.00031)}{0.00089\ \triangle x_t} + \underset{(.00008)}{0.0052\ x_{t-1}} - \underset{(.0031)}{0.0031\ \triangle p_t} - \underset{(.0006)}{0.0018\ p_{t-1}}$$

where q = per capita personal consumption expenditure for the good in question; x_t = total per capita personal consumption expenditures in year *t* (in 1958 dollars); $\triangle x_t = (x_t - x_{t-1})$; p_t = relative price in year *t* of the good in question (1958 = 100), calculated as the implicit deflator for that good divided by the implicit deflator for total personal consumption expenditures; and $\triangle p_t = (p_t - p_{t-1})$. Their equations for all spending categories were estimated over the period 1929-1964 using the *Survey of Current Business* as the principal source of data. While not as frequently cited (especially the long run estimate), they also derive short and long run elasticities with respect to total expenditures, which are 0.7407 and 1.2604 respectively.

The Globerman (1978) approach to indirectly isolating the effect of past consumption on present consumption is novel in the arts demand literature. He investigates the determinants of public perceptions about performing arts prices, including the role played by past attendance in generating more accurate price perceptions that can be viewed as stimulating attendance. Because this causal link occurs without any clarification of one's utility function (as is typical of studies that call themselves learning-by-consuming approaches) or postulation of an intertemporal utility function implying current investment sacrifice for future consumption benefits (as with rational addiction), it might be viewed as a "default" habit formation model. In might also be viewed as a more traditional price search model in contrast to the "utility function search" model of Lévy-Garboua and Montmarquette (1996; see also Brito and Barros, 2005). Despite this potential link to habit formation, the Globerman (1978) approach admittedly shares a key characteristic with a more broadly defined learning-by-consuming framework. Whether additional consumption clarifies the product characteristics of arts performances among older audiences with already established risk averse utility functions (Abbé-Decarroux, 1992), the actual prices that must be paid to access those product characteristics (Globerman, 1978), or the form and content of the utility functions defined over various product characteristics (Lévy-Garboua and Montmarquette, 1996), current and future consumption are linked to something learned from past consumption.[111]

The lesser known Globerman (1978) analysis is not normally discussed in this context, but is relevant to whether the interdependence of consumption across time periods can be considered "taste cultivation" and whether accrued human capital is the primary link of education to arts demand. He utilizes a population in-home survey of 1,004 Ontario adults (16 and over) stratified by five broad regions conducted as part of an arts attendance study (in contrast to an audience survey in Ontario during a similar time period that served as the database for Globerman and Book, 1977; see 3.2.2). Interview questions included frequency of attendance at arts performances and movies, as well as a related one regarding accessability of such events to the respondent's home: "How often are live theater, ballet, opera, and symphony concert performances given that are readily accessible from where you live?" The percentage of those answering "almost all the time" or "fairly often" is not independent of actual attendance patterns and varied widely by art form: theater (40 percent); concerts (27 percent); dance (21 percent); and opera (10 percent). Two questions were also posed regarding price awareness for each art form: (1) "What do you think is the lowest priced ticket for a performance in this area?" and (2) "What is the amount you normally spend on a ticket?"

Movie prices were by far the most well-known with an 81 percent answer response rate for both lowest and normal price questions. Performing arts response rates were generally slightly higher for the more easily answered normal price question and unsurprisingly varied directly with both the frequency of actual attendance and the stated degree of ready accessibility: theater (65 percent response); concerts (45 percent), dance (34 percent; although 35 percent gave an answer to the lowest price question), and opera (24 percent). Furthermore, variances around the mean perceived lowest and normal prices tended

[111] Interestingly, Abbé-Decarroux and Grin (1992), who do not use the term "learning-by-consuming,"contrast perceived product quality with actual product quality as it is clarified by their "theater-going as a lottery" model, whereas Globerman (1978) contrasts perceived minimum price with actual price as it is clarified by additional searches, as measured by actual attendance (see below). Also, Abbé-Decarroux and Grin speak of their effort to clarify the determinants of "entertainment habits" (p. 125), reminding us that efforts to classify different studies are perilous.

to decline with mean attendance frequency, with the lowest price variances occurring for the most frequently attended movies (mean frequency of 5.89 per year), and the highest variances for the least attended opera (mean attendance 2.49). While theater maintained this inverse relationship with the second lowest variance of perceived prices while having the second highest attendance frequency, concerts and dance reversed their expected orderings.

Globerman (1978) postulates a simple price search model with the amount of search activity varying positively with household income Y, car ownership (a dummy variable = 1), proximity to Toronto (a dummy = 1 if the respondent lives in the city), and highest formal level of education, E. If the dependent variable is defined as the estimated lowest ticket price and that perceived lowest price is negatively related to the amount of search, the coefficients on each of these independent variables should also be negative. Also, to control for the possibility that respondents might be answering the hypothetical questions about minimum price with very different types of performances in mind (e.g. a highly professional theater group in contrast to amateur productions), the ticket price cited as that normally paid by each respondent was also included to control for this potential quality bias. The expected sign on this estimated coefficient is positive. He also later introduces age and number of household children under age 16 as further control variables.

But what links this study to the taste cultivation problem is the inclusion of one final independent search variable: the individual's actual frequency of attendance, F, which should then also be negatively related to the lowest price perception. This variable is used as a proxy for a more theoretically desirable direct measure of the net benefits of making an additional price search, which Stigler (1961) originally linked to the existing dispersion of prices and the marginal cost of an additional search, as well as to the importance of a product in the searcher's utility function. Since these more direct measures of the net benefits of searching are unavailable, frequency of attendance was substituted. As recognized by Globerman and as further elaborated upon by Seaman (1981), this does introduce more circularity to the argument when linked to attendance than would be ideal. That is: $q = f(p^*)$, where p^* is perceived price and q is attendance (defined as frequency within the past 12 months); $p^* = f(\text{search})$; but search = f (q), making q = f (q), since Globerman did not have differential time period data to make that relationship the more typically lagged $q_t = f(q_{t-1})$. As stated by Globerman himself, when applied to policy advice his findings could be interpreted as "to stimulate attendance through lower search costs arts managers should stimulate increased arts attendance" (note 14, p.39).

However, some version of such circularity is endemic to dynamic models of demand in general. No matter how well-specified and no matter what the exact causal connection, all such models (with the possible exception of rational addiction, where managers can be viewed as having more passive marketing roles) can be interpreted as imploring organizations to increase attendance by increasing attendance. Furthermore, the Globerman (1978) finding that higher levels of formal education are related to lower perceived minimum arts prices (statistically significant for theater, and ironically also for movies) is suggestive of an important and generally ignored link between education and attendance that requires neither a "taste development" explanation, nor even a beneficial productivity effect in a household production context (as in Globerman and Book, 1977). In fact, while his results were "far from robust" and adjusted R^2 s averaging .3635 suggest important omitted variables (p. 35), his price search equations were statistically significant at the 0.05 significance level and the signs on all key variables were as expected, including the attendance proxy for the net benefits of incremental search

(and especially significant for the actual normal price paid quality control variable). At least, the further examination of the role played by incorrect price perceptions as an "unobserved barrier" (Globerman, 1978, pp.37-38) to higher arts attendance, and the role that past attendance (and other factors affecting the net benefits of search) can play in overcoming that barrier, whether viewed as generating a habit of arts attendance or the result of a learning-by-consuming process, would seem fruitful.

Lévy-Garboua and Montmarquette (1996) has become the most cited example of the learning-by-doing approach, probably because Abbé-Decarroux and Grin (1992) focus the primary attention of their earlier related analysis on the role of risk and how it affects age and arts consumption in a model with defined preferences (see also fn. 110). The further elaboration by Lévy-Garboua and Montmarquette (2003) of how this approach differs from rational addiction (2003) is especially enlightening and will be incorporated into the description. Their approach to the dependence of current consumption on past consumption does not include a lagged endogenous dependent variable in their estimated equations, but focuses instead on the contrast between the various predicted effects of key variables in testing their learning-by-consuming model (1996, p. 39). Consistent with the discussion to this point, they confirm the methodological challenge of how best to incorporate past consumption into studies of current consumption by observing that despite the general consensus among economists and sociologists that such effects are important for a wide variety of goods, "it is seldom possible to directly verify this assertion...using individual data and after controlling for many wealth, price and taste variables" (pp. 27-28).

Their approach fully accepts the non-Beckerian premise that changes/differences in behavior can be linked to taste changes/differences rather than subtle constraint variations and incorporates two key elements. (1) Any new experience of a good reveals an unexpected positive or negative "increment in his taste" for the good, with this increment treated *ex ante* as a zero mean random variable. (2) The concept of someone developing a taste for an art form, e.g. the theater, can be viewed as having experienced repeated pleasant surprises when attending plays and hence revises expectations upward. Lévy-Garboua and Montmarquette (1996) claim three theoretical advantages for this representation: (1) it is compatible with an assumed strong heterogeneity of tastes and the independence of individual choices; (2) it allows for extensive differentiation of cultural goods further magnified by the "unique nature of each 'cultural' experience provid[ing] new possibilities for surprises and implies long learning periods;" and (3) it maintains intertemporal separability of the utility function conditional on past consumption by viewing consumers as having uncertainty regarding their preferences that prevents them from rationally anticipating the future taste (utility) that will be acquired over time (p.28). While these are indeed three features of their model, only the second might be viewed as a clear "advantage" inasmuch as e.g., the also reputable rational addiction approach would not require strong taste heterogeneity or intertemporal utility function separability.

A more concise and simplified description of their model designed to facilitate its comparison with rational addiction approaches is provided by Lévy-Garboua and Montmarquette in their later overview of arts demand (2003), and the description below borrows from both their (1996) and (2003) contributions and where different, adopts the simpler (2003) notation (also at times modifying it slightly for added clarity). The utility function includes the quality adjusted quantities for all goods $i = (1,..., r)$ whose consumption "may give rise to non-systematic cultivation of taste" (1996, p. 28):

(16) $U = u (s_1 x_{1,} ... s_r x_r)$

where x_i = the quantities consumed of market goods and the s_i weights represent "subjective qualities" anticipated before the decision is made to consume the x_i goods, which depend on previous consumption experiences. A similar utility function can be defined for each time period. If we now define x_a as the particular market good, attendance at an arts performance, the effect of consumption experiences yielding additional information about the subjective quality of that good, s_a, can be represented in period t as (dropping the *a* subscripts on both s and x to simplify)

(17) $s_t = E_{t-1}(s_t) + \varepsilon_t, \qquad \text{if } x_t > 0$

where E_{t-1} represents the expectation operator before period t's choice, and ε_t is the "taste surprise" experienced in period t (i.e. $E_{t-1}(\varepsilon_t) = 0$) This can be called the "experienced taste for arts consumption in period t." As noted above, consumers who find themselves "developing a taste" for music (for example), will generally experience pleasant surprises, i.e. $\varepsilon_t > 0$ is more common than the reverse.

Consumers are viewed as basing their expectation of taste solely on their past experiences (and not as in the more "standard" efforts to introduce quality into arts demand functions as the result of reading subjective arts critic reviews, or based on other *a priori* objective criteria such as repertoire classification; see 3.2.5 below). Therefore, taste expectations are identical across all time periods (as noted, preserving the intertemporal separability of the utility function).

Lévy-Garboua and Montmarquette then define the taste constant Frisch demand function (i.e. marginal utility of income or wealth constant in contrast to Marshallian demand functions) for the arts for any time period and for any particular consumer as:

(18) $sx = D[\lambda\, p/s]$

where sx is the quality adjusted quantity of art consumption, λ is the marginal utility of "anticipated wealth" and is invariable over a consumer's life cycle, and p/s is the shadow price of arts consumption defined as the explicit price p normalized by the perceived quality of the experience s. Lévy-Garboua and Montmarquette view the non-observable λ as "easily linked to socioeconomic variables when current income is not known," and indicate that the demand functions will be linear if the period utility functions are simply quadratic (1996, p. 30).

Equation (18) clearly suggests that a good such as arts attendance that is assessed by a consumer as having a high quality s will have a low "personalized price." However, analogous to the household production model of the new consumer theory when the marginal product of any unit of attendance is quite high in producing "arts appreciation," this greater potency of each unit of attendance in generating quality s also implies that less quantity of the good x is required to achieve a given utility level (see utility function (16) which is defined in terms of sx). This generates a key insight from the learning-by - consuming approach, and allows Lévy-Garboua and Montmarquette to "impute" a price elasticity of demand from their empirical analysis even though they are missing a price variable in their vast database.

That is, if the price elasticity of $x > 1$ in absolute value, the experience of consuming the arts will have a positive effect on current consumption when the good was "enjoyable overall," but a negative effect

when it was not enjoyable overall (1996, p. 30). They clarify this relationship by modifying the demand function (18) so as to isolate the marginal effect of quality on the quantity of the arts consumed, $\partial x/\partial s$, which they derive after several steps to be:

(19) $\partial x/\partial s = - x/s\ (1 + e)$

where e designates the price elasticity of demand for x. This directly implies that $(\partial x/\partial s)(s/x) = - (1+ e)$, i.e. that the elasticity of arts attendance with respect to perceived arts quality (which they call the "taste elasticity") = - (1 + own price elasticity of demand for arts attendance). That elasticity will > 0 if e < -1, i.e. if the price elasticity is elastic. If the price elasticity is inelastic (e > -1), the quality (or taste) elasticity of the demand for the arts becomes negative, and unitary price elasticity implies generates a zero quality elasticity. As interpreted by Lévy-Garboua and Montmarquette, this allows them ("if the model is correct") to measure the price elasticity of demand with their extensive French Ministry of Culture survey data when the model measures accumulated experience and taste for consumption (1996, p. 30). As noted above in 3.2.2, normally price elasticity is not capable of being estimated in Type P studies due to the absence of ticket price data.

Since Lévy-Garboua and Montmarquette (1996) report estimated coefficients for as many as 26 independent variables in a single equation (probit, OLS and tobit estimations are performed), and some of their empirical results are reported elsewhere in this chapter, the focus here is not on the generally non-surprising evidence about the role of their many demographic and socioeconomic variables on either the probability or the frequency of attending the theater. Their distinction between unconditional and conditional versions of consumer choice is also ignored here. The focus instead is on their core evidence supporting their version of dynamic demand analysis and their imputed demand elasticity results. Since the Ministry of Culture survey was rich in opinion type questions, some of the key empirical results refer to those variables. For example, the authors view opinions referring to greater appreciation of the actors and the quality of the text of the play as indirectly measuring the taste for the theater. Two of their constructed variables, were designed to measure taste more directly. They used the "appreciation scores" from 0 to 10 that respondents had assigned to a list of 56 (23 theatrical writers and 33 actors/directors), and designated high scores of 9 and 10 as indicating "evidence of a taste for the theater" (p. 39). But they then found that writers were seemingly treated differently than actors and directors (based on the performance of these variables in their estimated tobit model), so they identified a taste for reading as a substitute for live theater among those who show a strong preference for writers, and vice versa for those giving especially high ratings to actors and directors. They found support for this view in the negative effect of reading journals and magazines on the frequency of theater attendance.

They found that the variable measuring the percentage of actors and directors known was the best measure of "the degree of familiarity with or experience of" the theater, and they designated a person who claimed to know more than 80 percent of the names put to him as knowing the theater well. They found it noteworthy that the performance of their variable designating knowledge of writers performed more poorly than their variable measuring knowledge of actors and directors, and concluded that "it is necessary to have attended the theater personally in the past in order to know the actors and directors whose talent can only be appreciated on the stage and in action" (p. 39). They thus identify this variable as their key measure of previous theater attendance and predictor of current attendance (and

based on their tobit estimation the probability of someone knowing more than 80 percent of the actors and directors not attending the theater falls from 0.49 to .02.

This finding then becomes the key to their imputing a price elasticity from their survey data, assuming as they concede that they are correct to use variables like the knowledge of actors and directors as indicators of subjective quality (s in the equations above) and that their model makes sense. They estimate the price elasticity of demand (see their note 7) for this experienced group of theater consumers as -1.47 based on an application of equation (19) above and the assumption that the average experienced consumer knows 85 percent of the actors and directors (yielding in their model an s value = 0.85), and that this type of consumer attends the theater an average of 3.87 times per year (so that x = 3.87). These parameters along with the estimated logit coefficient of 2.1262 on their knowledge of actors and directors variable (interpreted from above to be $\partial x/\partial s$), yields the calculation (not explicitly shown):

(20) $(\partial X/\partial s)\,(s/x) = -\,(1 + e) = 2.1262\,(0.85/3.87) = -\,1 - e$, or $0.467 = -1 - e$, or finally: $e = -\,1.467$.

A similar calculation yielded the lower price elasticity of about - 1.0 for the less experienced theater-goer.

Given the rarity of price elastic findings in the performing arts, especially as noted previously for an audience segment that is being characterized as having a strong cultivated taste for the arts, it is easy to question the many steps and assumptions required to impute this result. But Lévy-Garboua and Montmarquette view this result as fully expected from their model when one views experienced theater-attenders are those who have "completed their learning process" after experiencing many cases of pleasant surprises generating high s values, high quality adjusted quantities of arts consumption and low personalized prices in equation (18) above. In their view, had theater experiences generally led to unpleasant surprises and a reduction rather than increase in the subjective quality assessments, the result would have been price inelasticity.

Various findings of the Lévy-Garboua and Montmarquette (1996) study have been referenced elsewhere in this chapter. The focus in this section has been on their approach to incorporating dynamic factors into demand analysis and dealing with the taste cultivation methodological challenge. Their approach of endogenizing the discovery of consumer utility functions via a learning-by-consuming process and testing the model without the use of a lagged consumption variable is unique, and is not the only empirical approach that might be taken. For example, Brito and Barros (2005) model the dynamics of demand and prices in a learning-by-consuming model and suggest that the standard empirical approach of using such a lagged consumption variable is fully consistent with their version of that model. In addition, the above discussion has put into context the frequent citations of Lévy-Garboua and Montmarquette (1996) as confirming the importance of quality in arts demand, even though there are no explicit quality variables in their equations (see the overview in 3.1. and the more detailed 3.2.5), as well as their controversial finding that the price elasticity of demand for theater is higher (at -1.47) for more knowledgeable and experienced theater-goers than for other consumers (e.g see 3.1.1, and fn 59). This finding of price elastic demand is not only inconsistent with other empirical evidence when consumers are segmented and separate elasticities estimated, but is not an inevitable result of learning-by-consuming processes inasmuch as Brito and Barros (2005) derive an expectation of both low income and own price elasticities (p.104) due to the way that flows of cultural good consumption interact with

the decay of the stock of culture in response to an exogenous "shock" in the relative price of cultural goods in their particular dynamic model (pp. 97-98).[112]

In contrast to the learning-by-consuming approach, the rational addiction model combined with specific consumption capital in a household production framework has a different modeling setup and can generate different implications, some of which were described earlier in the section 3.2.2 discussion of Globerman and Book (1977). Despite its popularity in the arts literature stemming largely from Stigler and Becker (1977) and the intuitive appeal of its simplified version suggesting that past consumption generates productive human consumption capital than makes future consumption "cheaper" in terms of generating the less observable but clearly important final product "arts appreciation," attempts to verify a more technically precise version of this framework have not always succeeded. For example, while applied to cinema rather than the performing arts, Cameron (1999) finds his results in testing for this phenomenon problematic and offering "little support" for the rational addiction model (p. 619). This is in large part due to the additional requirements that must be met in finding evidence for addiction in the more technical version of that model. That is, the household production element of the rational addiction model generates an important distinction between shadow price elasticities linked to arts appreciation and market price elasticities related to observed arts attendance (see below). But the intertemporal non-separability of the utility function feature of the model (stressing the importance of making conscious intertemporal shifts in consumption by investing in human consumption capital creation now in anticipation of being more capable of enjoying the arts or other goods later) stresses the rate of time preference of consumers, i.e. their ability to be far-sighted rather than short-sighted. In this context findings of "too-high" a rate of time preference is inconsistent with the premise behind the rational addiction framework.[113] Tests for rational addiction also involve investigating the relationship between the interest rate and the discount rate, as described below.

Lévy-Garboua and Montmarquette (2003) assist in understanding the rational addiction perspective by contrasting it to their learning-by-consuming approach using notation that will be familiar from the prior discussion (and borrowing from the original contributions of Spinnewyn, 1981; Stigler and Becker, 1977; and Becker and Murphy,1988). A brief version of their description is summarized here focusing on the implications for the interpretation of the low estimated price elasticity results that have generally been found in empirical arts demand studies. They postulate two commodities, X and y, where X is "art appreciation" (not to be confused with x, which as in the learning-by-consuming model designates arts performance attendance), and y represents other commodities, over three time periods $t = 1, 2, 3$, and a time additive utility function:

(21) $U(X_1, y_1) + \beta U(X_2, y_2) + \beta^2 U(X_3, y_3)$

Rather than using the production function approach to transform arts attendance x into arts appreciation

[112] It is striking that Lévy-Garboua and Montmarquette (1996) is not cited, even though the Brito and Barros (2005) analysis does not clearly build upon that earlier model and results..

[113] McCain (2003, p. 448) notes that efforts to empirically test the rational addiction model have not been "entirely satisfactory," and that at times findings of high rates of time preference have been found to be "implausible" by advocates of the rational addiction model.

X whereby X = f (x, t), with t as time devoted to producing X (see Globerman and Book, 1977; 3.2.2), x can be transformed into X via the s quality parameter as utilized in the learning-by-consuming approach. Thus, for t = (1, 2, 3):

(22) $X_t = s_t x_t$

(23) $s_t = s_{t-1} + r x_{t-1}$ for t = (2, 3)

with r>0 representing the beneficial effect of music-specific capital (be it from consumption or training; see e.g. Smith, 1998). Individuals maximize utility given (21), (23) and a wealth constraint:

(24) $W = \Sigma\rho^{t-1} (px_t + y_t)$ for t = (1 to 3)

where ρ is the interest factor and p is the price of arts attendance. Importantly, the first order conditions for maximizing utility generate shadow prices Π_i for X, arts appreciation, that vary by time periods 1, 2, and 3 as follows:

(25) $\Pi_3 = p/s_3$

$\Pi_2 = p/s_2 (1 - p\alpha_3)$

$\Pi_1 = p/s_1 [1 - p\alpha_2 (1 - \alpha_3) - p^2\alpha_3]$

with $\alpha = rx_t/s_t$ defined as the rate of addiction, or the rate at which the "taste" for art increases with the consumption of art, and is always viewed as positive although it might vary over the life-cycle, most typically rising at young ages and eventually declining (Lévy-Garboua and Montmarquette, 2003, p. 205).
Under normal conditions the relative shadow prices of arts appreciation, X, will decline over time.

There are two especially important implications of this framework:

(1) While it might be thought that with a declining relative shadow price of art appreciation over time, the quantity of X will grow as well. However, that will only definitely occur when the discount rate related to the rate of time preference does not exceed the interest rate (ρ). More impatient consumers, therefore, may actually reduce their consumption of arts appreciation over time even in the face of a declining relative shadow price.

(2) As is true of any variation on the household production consumer choice framework, even if consumption of the unobserved art appreciation X rises over time, there is no guarantee that the observed attendance at arts events x will similarly increase over time. As usual, this is because with the cultivation of taste, s is increasing hence making each unit of x more productive in generating a unit of X. Since less x can generate a give X, the net result is uncertain, although again, x is more likely to rise the lower is the discount rate and the higher is the interest rate.

Finally, this critical distinction between arts appreciation X and arts attendance x provides one of the theoretical justifications (discussed above in section 2.1.2) as to why one might expect an inherent

bias toward relatively low price elasticities of demand for arts attendance relative to other goods (at comparable explicit prices). That is, there is a distinction between the shadow price elasticity of X in any time period (E) and the market elasticity of arts attendance (e). Following the Lévy-Garboua and Montmarquette (2003) summary of the literature on this relationship, these two elasticities can be written for time period 1 as:

$$(26) \quad E_{11} = e_{11} + \sum_{t=2}^{3} E_{\alpha t\ p1}\, E_{x1\ \alpha t}$$

That is (redefining this in absolute value terms for clarity), the shadow price elasticity is always higher than the market price elasticity due to the effect of positive addiction. The first E term following the Σ term is defined as the elasticity of the expected future addiction rate (in t) to current price, and the second E term is defined as the elasticity of current arts appreciation to the expected future addiction rate (in t), with the first elasticity expected to be negative and the second positive, but having a complementary influence on the absolute value of the resulting elasticity. The key summary point again is that there is nothing inconsistent between having a price-elastic demand for art appreciation X and a market price-inelastic demand for arts attendance x (Lévy-Garboua and Montmarquette, 2003, p. 206). Note that this is a quite different reason for getting low ticket price elasticities (holding prices constant) than others discussed in section 2.1.2 such as the distinction between the "full price" of attending an arts performance and the ticket price component.

In summary, while many arts demand studies have improved the performance of their estimated equations by including a one-year time lagged dependent variable capturing the effect of past consumption on future consumption, that is not the only, or even necessarily the preferred way to capture the dynamic effect of taste cultivation in arts demand analysis. Even if such a lagged variable is introduced, the underlying theoretical justification for its inclusion is a complex subject, with competing approaches having somewhat different implications, especially for arts management strategy and the future growth of performing arts demand.

3.2.4 *The Product and Geographic Market Problem: Substitutes (and Complements)*

In addition to the unresolved issue of whether the arts are price inelastic luxury goods, Lévy-Garboua and Montmarquette (2003) have found no definitive evidence in the literature regarding close substitutes for the performing arts. Reflective of this dilemma is that neither Moore (1966) nor Luksetich and Lange (1995) include any substitute prices even though they had reasonably disaggregated data that might have allowed some proxy for the prices of localized alternative forms of not only "entertainment," but other art forms beyond either Broadway theater or symphonic music. While Withers (1980) estimated fairly strong cross price elasticities (0.62 and 1.35) for his famous "reading and recreation component of the CPI," the t-statistics were not especially strong, and a time-series study of the aggregate performing arts in the United States is not well-adapted to capture localized competitive effects, or to distinguish among the sub-categories of the performing arts.

Corning and Levy (2002) target the dilemma perfectly, when they observe that the most direct competitors of their three southern California theater venues are the Santa Barbara City College Theater Group, the Ensemble Theater Company, and Civic Light Opera, but "unfortunately insufficient price

data were available to construct a useful variable" (note 5, p. 234).[114] They were thus forced to fall back on the Throsby and Withers (1979) and Withers (1980) inspired "recreation component of the CPI" and found that none of their four series variations (admissions, recreation, and recreation services averaged across U.S. cities, or recreation in western urban areas) had any "measurable effect in any configuration and was dropped" (p. 227).

Some suggestive evidence on substitutes was developed by Lévy-Garboua and Montmarquette (1996), although no variable in their vast database really captures the price of substitutes. Confusingly, they identify among their "price and quality" variables "POPSUB," which they claim reflects respondents' "'opinion' on substitute prices of other forms of recreation" (Table A.1. p. 45). However, in explaining its negative coefficient in their theater demand equations, they clarify that variable as really reflecting the perceived quality of available substitutes (although they also call it "the inverse of the price of substitutes;" p. 41). That is, this variable reflects one of the reasons given by survey respondents for not attending the theater, among which is "other recreations or other types of performing arts are more attractive than the theater" (p. 41). While this definition does not allow any separation of the effect of the broadly defined "other recreations," nor does it clarify whether quality, price or some other dimension was most central to being "more attractive," it does have the merit of incorporating art forms other than theater as substitutes. The relatively strong negative coefficients for this variable are suggestive that the relevant product market cannot be defined as narrowly as "just theater," even though this evidence is not derived from direct cross-price elasticity of demand information.[115] This conclusion would also be supported by their finding of a negative effect of regular magazine and journal reading on the frequency of live theater attendance, suggesting that those two forms of intellectual stimulation and entertainment are partial substitutes (see section 3.2.3 above).

In fact, as reflected by this reading versus live theater result, evidence regarding substitutes and complements need not stem solely from cross-price elasticities. Available quantities of potential substitutes, or proxies reflecting technical improvements in the quality of such substitutes, may be revealing indicators of substitution relationships even when not justified as alternative measures when

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[114] In a non-regression case study of marketing strategies for the Los Angeles Music Center, Kaali-Nagy and Garrison (1972) identified eight potentially competing Southern California attractions: Marineland, Busch Gardens, Disneyland, Knott's Berry Farm, the L.A. Zoo, the San Diego Zoo, Huntington Library and the L.A. County Museum.

[115] Industrial organization and antitrust economists would hasten to observe that at least "antitrust market" analysis often requires that cross-price elasticities of demand be estimated for more than just one potential substitute and weighted by the relative market shares of each good. The relative importance of fixed and variable costs for the products being investigated is also useful to allow a comparison of so-called own price "critical-elasticity" benchmarks with most likely "actual" own price elasticities derived as a function of the weighted sum of cross-price elasticities. Thus, the importance of any one cross-price elasticity is difficult to fully evaluate in isolation, and the "required" magnitude of the cross-price elasticity necessary to consider that good a "close substitute" for another will also vary with market expenditure shares. Furthermore, the ongoing issue of "substitutes at what price" is again relevant (See section 3.1.2).

substitute price data are unavailable.[116] Those non-price variables are discussed following Table 15. The types of price (or expenditure) variables utilized in arts demand studies to capture cross-price elasticity effects are documented in Table 15 and identified by study and results.. Some version of movie prices dominates,[117] followed by various recreation or entertainment price indices. It was not always presumed that arts and entertainment alternatives would be substitutes for the high arts, and the inclusion of such variables should ideally be viewed as attempts to determine the nature of those relationships rather than just confirm the consistency of the empirical evidence with consumer choice theory (in contrast to the dismay at generating positive and statistically significant own price elasticities; see Jenkins and Austen-Smith, 1987). Nevertheless, Felton's (1992) explicit expression of neutrality regarding the expected signs of such variables is rare (i.e., "it was deemed equally likely that the two [alternative arts] experiences would be substitutes or complements," p. 4), and most discussions of the empirical results reflect the expectation that gross substitution should dominate.[118] The entries in Table 15 are not listed chronologically by study, as with previous similar tables, but by the proximity of such measures to the performing arts and their degree of disaggregation. Some studies had hoped to estimate additional cross-price effects, but lacked sufficient observations in the cross price variables to include in regression equations (e.g. in Felton, 1992, the cross-price effects of ballet and opera prices could not be estimated).

Table 15
Measures of Alternative Prices in Arts Demand Equations

[116] However, finding useful and effective data on either the price or quantity of substitutes can prove elusive, as exhibited by Fernández Blanco and Baños-Pino (1997), who considered many alternative price and quantity measures of video and television competition with cinema before resorting to a single binary variable to reflect the expanded availability of public television in Spain after 1984 when the state television monopoly ended. Other variables such as the number of television sets, home video recorders, supply of television programming, or price of video rentals either could not be constructed due to data limitations or performed badly in preliminary regressions. These types of measures would also be potentially relevant to the live performing arts.

[117] The enthusiasm for cinema prices in performing arts demand equations is not reciprocated in cinema demand analysis, where performing arts prices never appear. One possible reason, beyond mere measurement problems and data availability, is that while cinema and theater may appear to be excellent substitutes, the greater availability of cinema in all parts of a country compared to the more concentrated location of theater in only the major urban centers, may reduce the practical degree of such substitutability. This was argued for the case of Spain by Fernández Blanco and Baños-Pino (1997, p. 62).

[118] At times, this expectation was clearly dependent on the particular measure being used. For example, while Felton (1992) was quoted for her neutrality regarding the expected relationship between two types of performing arts alternatives, that view was not present in her paper with Greckel (1987), where they dropped their "poor" measure of substitute prices (i.e. the entertainment component of the CPI) not only due to weak and statistically insignificant coefficients but because in most equations the "the sign of the coefficient was negative, indicating complementarity instead of substitution" (p. 64).

A. Alternative Prices:	Dependent Variable (Study)	Results
Symphony subscription price	# Subscribers to large Ballet companies, and separately to small Ballet companies (Felton 1992)	Large companies: + and stat. sig. at .05 Reference cross price elasticity = 0.67; Not significant for small
Average price of 12 other local companies including those within the same art form	Quantity of tickets sold to residents and tourists by each of 13 local arts organizations; 2 theater, 2 opera, 4 symphony, 3 ballet and 2 modern dance (Gapinski 1988)	No cross price effects were significant for any of the 13 companies
Average price of other local companies excluding those within the same art form	Quantity of tickets sold by each of 13 local arts organizations; same as Gapinski 1988 (Gapinski 1986)	Cross price elasticities 2 theaters: 0.18; 0.09 2 opera: 0.13, 0.15 4 symphony: 0.44, 0.55, 0.65, 0.53 3 ballet: 0.28, 0.21, 1.10 ; 2 Modern dance: 2.28, 2.06
Average real cinema ticket price	Performing arts tickets sold/100,000 pop (Bonato et al., 1990)	Negative; statistically insignificant
Real movie ticket price	Ticketed attendance for various art forms (Touchstone, 1980)	Theater: + (t stat 0.90) Symph: + (t stat 1.70) Ballet: + (t stat 1.12 Opera: - (t stat -1.35)
Cinema price index and Composite good price index in theater equation; Theater price index and Composite good price index in cinema equation	Expenditure share of theater; expenditure share of cinema (Pommerehne & Kirchgassner 1987)	Close to zero cross-price effects for both theater and cinema expenditure equations
Average nominal cinema price unadjusted as well as adjusted for regional variations; Entertainment and recreation price index	Attendance / population for the Royal Shakespeare Company in London (Gapinski, 1984)	Weak performance on all variations of cross-price measures; not included in reported demand equations

Movie theater price Price index of leisure goods	Paying performing arts (mostly theater and opera) visitors per capita German pop (Krebs and Pommerehne, 1995)	Neither significant, or wrong sign; dropped from final equations
Price of audio recordings	Symphony attendance / population (Ekelund & Ritenour, 1999)	Negative; statistically significant only at 0.10
Entertainment component of the consumer price index CPI	Attendance at subscription concerts for 2 Louisville music companies (Greckel & Felton, 1987)	Negative and very low statistical significance; dropped from study
Recreation component of the CPI; 4 variations including localized regional version	Tickets sold for performances at 3 venues of the Pacific Conservatory of the Performing Arts (Corning & Levy, 2002)	All versions insignificant; dropped from equations
Reading and recreation component of the CPI	Attendance / population for aggregated performing arts (Withers, 1980)	Cross price elasticity 0.62 to 1.35 in time allocation model; modest t statistics
All personal expenditures for education and recreation	Number of attendances / population in time series model, theater and symphony (Goudriian & de Kam, 1983)	Close to zero and insignificant: theater; Expend elasticity = 1.5 symphony (t = 4.19)

A review of Table 15 makes clear that only Withers (1980), and Gapinski (1986) had any real success in capturing positive cross-price effects for the performing arts, with Withers being the only remotely successful application of an aggregated recreation or entertainment price index. However, Felton (1992) generated evidence of a positive cross price effect of symphony prices on large budget, but not small budget ballet companies, and Goudriian and de Kam (1983) found evidence of a positive effect of education and recreation expenditures on symphony, but not theater, attendance in their time series model (they did include a substitute price term in their cross-section equations). Despite its relative popularity, various versions of movie prices performed very poorly (only Touchstone, 1980, came close to an expected result in her symphony equation and the coefficient in the opera equation was negative). In fact, it can be safely concluded that there is no empirical evidence that movies are effective substitutes for the performing arts. Ekelund and Ritenour (1999) were troubled by the unexpected negative coefficient on their price of audio recordings variable, and stressed that it was statistically significant at "only" the 0.10 level.

While Gapinski (1986) has understandably received all of the attention, it is noteworthy that his earlier attempt to find cross-price effects between cinema and recreation price indices and attendance at the Royal Shakespeare was not successful (Gapinski, 1984), and his later study of resident versus tourist

demand using the same 13 arts companies as in his 1986 study (and with a more inclusive variation of his 1986 substitute price variables) also failed to generate any significant results. It is interesting that the Gapinski substitute prices that omitted any "intra-art form" components (1986) were more successful than the versions that included such intra-art form prices (1988), although the two studies were not otherwise identical. Also, it is puzzling that citations of Gapinski (1986) almost always claim that he found evidence of substitution across art forms and stress the fact that his cross-price elasticities are greater than 2.0 in some cases, despite the fact that the cross-price elasticities are below 0.20 for four of his 13 companies, and 0.65 or lower for all but three of his companies (with two of the dance companies being as low as 0.21 and 0.28).[119] Furthermore, Gapinski himself stresses that the two modern dance companies having those unusually high cross price elasticities are those with the lowest attendance and most "heavily contemporary" of all the companies in his study (p. 22), and that the "clearest pattern to emerge" is that "a price change by a single company alone has minor impact on a second company" and that the "greatest attendance response to a price maneuver occurs for the initiating firm itself" (p. 23), which is especially noteworthy given the quite inelastic own price elasticities that average less than -0.30 for all art forms (see Table 1, Gapinski, 1986). However, among the rarely discussed results are his projections of the effects of price changes by rivals acting together rather than unilaterally (p.24), with one of his examples being a loss of 4,800 patrons annually for one of his theaters (THE2) if all other non-theater companies reduce their prices by 10 percent (an attendance decline that he argues is almost twice what could be generated by own price changes by THE2 itself).[120]

However, despite these clarifications regarding the full variety of Gapinski's 1986 results, the overall message of his path-breaking and sophisticated study is that price interdependencies among performing arts firms in specific geographic markets are potentially important, and that the focus should clearly be on further efforts to find evidence of the degree to which "the lively arts substitute for the lively arts." To date, no successful replications or extensions of the Gapinski (1986) analysis have appeared.

There is little direct cross-price elasticity evidence regarding one aspect of complementary goods, i.e. the effect that higher prices for transportation (for given distances from the venue), parking, child care, dining and other components of the full price of an arts performance visit. While the roles of the value of time and the time intensity of attending the arts, and the percentage of the ticket price in the full price of an arts experience in interpreting the own price elasticity evidence were thoroughly discussed in section 3.1.2, the prices of such complementarity activities are rarely included directly in

[119] The rare exception of a more accurate portrayal of the Gapinski (1986) results is Abbe-Decarroux (1994), who laments the inability to find sufficient real income and substitute price data to include in his seven year, 64 productions demand function for Geneva theater, but notes that various studies have found that performing arts demand is income insensitive and Gapinksi (1986) found that it is also substitute price insensitive (note 6, p. 103).

[120] It is possible, but unlikely, that all other firms would independently change price by roughly the same magnitude, and Seaman (2004) provides evidence that successful collusion, whether on price or other issues, has no doubt been rare in the performing arts. While Seaman (2004) calls for renewed interest in horizontal firm interaction in the performing arts, the more balanced version of Gapinski's 1986 results suggests the magnitude of that challenge.

arts demand functions. Two exceptions are of interest. Carson and Mobilia (1989) uniquely insert the past and current consumer price index for the New York region in addition to theater ticket prices in their study of Broadway attendance, and find strongly negative effects on both prior and current attendance (a "CPI elasticity" as high as - 3.9). They surmise that this general CPI (which is not limited to the recreation or entertainment components that are used as proxies for arts substitutes) is capturing higher prices of the complementary goods used with arts attendance (which they believe is an especially credible explanation given the luxury good evidence that they also find during the non-summer seasons). However, this interpretation is certainly not confirmed by hard evidence, and no subsequent results are reported for any components of the CPI focused on transportation, restaurant, or child care prices that would support that view. Lévy-Garboua and Montmarquette (1996) include a variable "opinion on cost of transportation and children" that, while based on perception, seems much more targeted. And in fact coefficients of this variable in their frequency of theater-going OLS equations (both within the last four years and during the last year) are negative with t-statistics of - 2.79 and - 2.87 (the result is weaker in their tobit equation for attendance during the last year), consistent with such services being complements to arts attendance.

While success in identifying relevant substitutes (or complements) for the various performing arts has clearly been limited using cross-price data, some insights have been generated using non-price measures of the availability of potential substitutes. The Lévy-Garboua and Montmarquette (1996) finding of a strong adverse effect on theater attendance of perceptions of high quality of such available substitutes was discussed prior to Table 15. Bonato et al. (1990 had no success with their cinema price variable (Table 15), but did find strong negative effects of the # of television subscribers on the tickets sold in the performing arts in Italy (both normalized by population). Interestingly, this television effect was not present in the Krebs and Pommerehne (1995) study of the overall performing arts in Germany using thirty years of data (1962-92), but by contrast was found by Pommerehne and Kirchgassner (1987) for the theater expenditure share in Germany between 1964-84 with their "share of households with TV set variable" (which has an even stronger negative effect on the cinema expenditure share) . However, Pommerehne and Kirchgassner also find enigmatic results in that the number of new movies coming into cinemas has a positive effect on theater expenditure shares (modestly significant at the 0.10 level), although the number of movies played on TV has the expected negative sign (although not statistically significant).[121] Given the dearth of evidence regarding the reverse effect of the performing arts on cinema demand (see fn. 103), they also find interesting evidence that the number of theaters has a negative effect on the cinema expenditure share, with a t statistic of -2.16 (Table 3, Pommerehne and Kirchgassner, 1987).

Further non-econometric evidence is provided by Heilbrun (1997) that the popular arts have had notable negative effects on the high arts by examining the press coverage of both art forms over time in the *New York Times*. Waterman et al. (1991) focus on a different aspect of changing tastes and technologies by stressing the complementarity that can exist between the media arts and the live performing arts by virtue of the electronic transmission of live performances that can build audiences,

[121] Their finding that the number of movies played on TV actually has a significant positive effect on the cinema expenditure share (with a t statistic of 4.27) suggests surprising complementarity, a result that they rationalize as TV movies stimulating people "once again" to visit the cinema (Pommerehne and Kirchgassner, 1987, p. 51).

and Helibrun (1993) would also stress the importance of the live performing arts taking advantage of the technological developments that have been important to the media arts, even if not being as optimistic as Cowen (1996) and Cowen and Taborrok (2000) about these potentially complementarity relationships.

The relative success of Gapinski (1986) in studying the particular geographic area of London raises an issue not really addressed by the Table 15 results: what is the geographic scope of the market for the performing arts? Substitutes or complements in the form of television programming or other forms of the media arts, for example, can extend the geographic scope of the relevant market far beyond any localized geographical region. But any such competition from other live performances (not limited to the arts) or even from attending the cinema rather than watching movies at home, raises the issue of the proper geographic as well as the proper product market.

The presumption is certainly that any such competition would be highly localized. Yet the significant role for tourists found by Gapinski (1988) for the London performing arts (a variable also considered but not utilized in Kelejan and Lawrence, 1980, but one not found to be significant by Bonato et al., 1990), hints at an important highly mobile audience that may be capable of shifting arts consumption across much broader geographical areas. Seaman (2004) includes a survey of the literature on this topic which stresses the possibility of larger geographic markets. For example, Moore (1968) found that 30 percent of the audience for New York theater is from beyond metro New York City, and Escaleira (2002) concludes that no relevant local markets exist for symphonic music in Portugal due to the prevalence of private and government sponsored touring companies. Seaman (2004, p. 186) also cites discussions with opera experts that identify cross-regional competition for sponsorships and press coverage that makes the program choices of widely dispersed opera companies potentially interdependent. Verhoeff (1992) confirms the negative effect that distance has on performing arts attendance in the Netherlands (see also Zuzanek and Lee, 1985, applied to London Ontario), but also found surprising variability in the distances that people travel to performances when controlling for theater size and quality, with one case requiring extending the distance to nearly 70 kilometers to capture 90 percent of the audience and with only five percent of the audience living within the nearest zone (p.76). And the Waterman et al. (1991) study of the role of the media and the arts above stresses the role of electronic transmissions of arts performances not just in expanding audiences, but in specifically reducing the cost and location barriers to participation in the arts, with unstated but suggestive implications regarding the geographic area over which arts organizations compete for such audiences.

Despite this suggestive evidence that the geographic scope of effective performing arts markets need not be as localized as generally assumed, Forrest et al. (2000) provides the most sophisticated econometric evidence regarding the important negative role of distance traveled in performing arts demand. Not uncommonly, their demand analysis was prompted by a more fundamental question, in their case the search for a justification for government subsidies to the performing arts that would not depend primarily on difficult to quantify externality and public goods arguments (a variation on the questions motivating Moore, 1966, and Withers, 1980, and perhaps as noted in the Introduction, an underlying current moving much of the private arts demand literature). They apply a zonal travel cost model to data regarding the Royal Exchange Theater in Manchester, using cross-sectional analysis to avoid the necessity of finding long runs of box office data in order to generate sufficient real price variations. Their price variability is derived from the notion that all potential consumers face different

effective prices due to the varying transportation costs they face in traveling to the venue.

Their goal is to use such travel cost data (along with education, auto ownership, social class, and retired versus working population control variables) to estimate demand functions (using a "visitor rate" dependent variable defined as the number of people attending from each of 20 zones divided by the adult population of each zone) so that consumer surplus estimates can be generated in order to evaluate whether, given high operating costs and the difficulty of engaging in "spatial price discrimination," regional repertory theater can be viewed as "commercially non-viable but socially valuable" (pp. 383-384). Using distance as a proxy for travel costs, they also assume that an increase of 2.66 km is equivalent to an increase of £1 in the cost of attendance, and that symmetrically a £1 increase in ticket prices is the equivalent of shifting the population of each zone outwards from the theater by 2.66 km. They then calculate for each of 20 zones *i* the change in total visitor numbers V with respect to a change in ticket price T (where V was derived from their visitor rate (VR) demand function dependent variable by multiplying VR by the adult population in each zone), such that $dV_i / dT = 2.66POP_i (dVR_i / dD_i)$, where POP is the adult population of each zone and D_i is the distance from each zone location to the theater. Elasticity is then calculated (for $i \neq 19$, since zone 19 was omitted due to predicted visitors from the regression equation being negative for that zone) as:

(27) $(\Sigma dV_i / dT) (T / \Sigma V_i$

Using a mean ticket price for the week evaluated of £9.50, they estimated a price elasticity of demand of -1.24, which they interpret as being reasonably close to the revenue maximizing pricing strategy when marginal cost in the non-capacity constrained case is nearly zero. Interestingly, calculations of elasticity for individual zones (with prices different from the mean) showed inelastic demand in areas with the largest values for their educational level control variable but elastic demand elsewhere (another example of the importance of segmenting audiences in estimating demand elasticities). Hence, they conclude that, absent the ability to price discriminate based on the location of their customers, the theater is seriously constrained in generating additional earned revenues, since price increases would not increase total revenues and price reductions would generate at best very modest additional revenues (at a mean price elasticity of -1.24) and the implied additional attendance would quickly create capacity constraint problems. Thus, the combination of their related finding of reasonably large consumer surplus benefits and the limited ability of the theater to generate more earned revenue leads Forrest et al. (2000) to conclude that the current government subsidy level was justified.[122]

[122] They also addressed the issue of the possible endogeneity of residential location, whereby people with strong arts demands would locate in close proximity to arts venues. While it is widely assumed in the literature that arts attendance will be higher for those living in urban areas or in locations with relatively large populations, since access to the arts is higher in those areas, that issue is rarely addressed as a simultaneity problem. They argue that this problem creates a downward bias in their estimate of consumer surplus with unknown magnitude (Forrest et al., 2000, pp. 394-395). Bajic (1985) also finds some evidence of theater location being a factor in the housing choices of those with especially strong theater demand in Toronto (a narrow segment of high income and highly educated consumers), but that this result is hardly typical of arts consumers, much less the general population.

Finally, there is a small literature that addresses this issue, not by inserting the prices or quantities of consumption alternatives into a regression equation on arts attendance, but by using econometric techniques to address essentially an audience overlap or co-patronage question: "Are high arts and popular arts (or sports) consumers the same people?" These studies by Prieto-Rodríguez and Fernández-Blanco (2000) regarding classical and popular music, Fernandez-Blanco and Prieto-Rodriguez (2000) regarding live sports and the live arts, and Montgomery and Robinson (2005) also regarding sports and the arts generate conflicting but intriguing results.

Fernández-Blanco and Prieto-Rodríguez (2000) use a bivariate probit model to explore the popular/classical music relationship (including rarely used dummy variables that capture interactions between occupation and education and occupation and age). They are motivated in part by the learning process models of Abbé-Dacarroux and Grin (1992) and Lévy-Garboua and Montmarquette (1996), and by the frequently cited non-regression based findings by Kurabayashi and Ito (1992) that there is a negative correlation for both sexes between two types of popular music and Japanese music (suspected to be due in large part to their very different musical scales), and a negative correlation for males between classical and popular music consumption. They use data from a very large (6,632 person) survey in Spain (the Structure, Conscience and Class Biography Survey, ECBC-91) that is broadly similar to the U.S. General Social Survey (GSS) used by Lewis and Seaman (2004) but with some important limitations. It combines information about individual socioeconomic characteristics with data regarding leisure time activities including both popular (but only as a combined category of pop, rock, folk and crossover formats) and classical music consumption (although not distinguishing attendance at live performances from listening to recordings for either broad type of music).

They estimate a probit equation for both types of music by regressing a (0,1) dependent variable for "fondness" of music (= 1 if listening frequency was either daily or weekly, and = 0 if never, annually, or monthly) on 51 socioeconomic and geographic location independent variables that can be divided into about five actual "categories" of variables (hence only arguably exceeding the 26 independent variables used in the largest Lévy-Garboua and Montmarquette equation, 1996). They conduct two important types of tests: (1) an examination of the correlation between the estimation errors corresponding to each group (i.e. 0.489, significantly > 0) leads them to "reject the hypothesis that classical music fans and popular music fans belong to independent groups" and to stress instead the complementarity between both types of music due to an "innate" taste for music within both groups (pp. 153-155); and (2) a comparison of the performance of the socioeconomic factors in both equations so identify any unique characteristics of both audiences. They find that no significant gender, marital or urban location differences between both audiences, and a surprisingly strong common link to higher education (perhaps consistent with the omnivore evidence inspired by Peterson, 1992), although parental education has only a strong positive effect on classical music. Other notable differences include the role of age (negative and non-linear on popular music audiences, but perhaps to be expected from the earlier discussion, only significantly positive for classical music in the 30-45 year old group); a strong positive effect of white collar occupations on classical music only, but a strong connection of students, "employees" and the unemployed with popular music (although housewives and the retired are big listeners to classical music). Despite the distinguishing characteristics of the two audiences, the Prieto-Rodríguez and Fernández-Blanco (2000) analysis is a notable contribution in support of the high and low arts as complements instead of substitutes.

Whether this complementarity extends to sports versus the high arts is more ambiguous. Applying essentially the same analysis from the same database, Fernández-Blanco and Prieto-Rodríguez (2000) once again find significant positive error covariances among three uses of leisure time and hence reject the hypothesis that those who attend live sports events (or who visit the cinema) and those who listen to music (but importantly not distinguished between popular and classical) belong to independent groups. Thus, they conclude that live sports do not really seriously compete in time allocation against the consumption of music or cinema. However, this conclusion is weakened by the asymmetry between questions regarding actual attendance at sporting events (and cinemas) and merely listening to music, and by the lack of a distinction in this study between popular and classical music. Furthermore, as also stressed by Montgomery and Robinson (2005), their finding of substantial gender and educational differences between sports and non-sports audiences tends to undercut their basic conclusion, and there are also more differences regarding occupation, marital status and family responsibilities, and city size than were present in their study of popular vs. classical music.

Hence it is not surprising that Montgomery and Robinson (2005), using less restrictive 2004 U.S. survey data from the Performing Arts Research Coalition (PARC, with 8,000 respondents), find more ambiguous relationships between sports and the arts as well as some notable *complementarities* among various types of arts events (a result in contrast to the Gapinski 1986 emphasis on intra-lively arts substitutability). In short, using an approach similar to that of Prieto-Rodríguez and Fernández-Blanco, but using "attendance frequency" and "percentage of total events attended" measures of the dependent variable instead of a dichotomous approach (hence also dropping the bivariate probit estimation technique), they find: (1) there are significant differences in the demographics of audiences for different types of recreational events, but "little evidence that arts and sports compete for audience," including some evidence that highly socially active individuals who attend sporting events are more likely to also attend arts events (here agreeing with Fernández-Blanco and Prieto-Rodríguez); however (2) when total event attendance is held constant and shares of attendance at various events are examined, arts events are found to be complimentary while other events including sports are substitutes for the arts. Yet, their overall finding is that (contrary to the relatively weak cross-price elasticity evidence documented in Table 15), by far the most important live arts competitor is the cinema, which is the strongest competitor with all types of events (amateur and professional sports, live rock, live comedy, nightclubs, dance, opera, theater and orchestra).

In summary, despite the conflicting and often insignificant results stemming from empirical efforts to clarify the substitution and complementary relationships affecting the performing arts, and the remarkable lack of any effort to replicate or extend the seminal, although actually conflicting, findings of Gapinski (1986),[123] there is some noteworthy research under way with the potential to greatly improve our understanding of these issues.

3.2.5 *The Product Quality Problem*

With the possible exception of the annual generic homage to *The Nutcracker,* the performing

[123] The only exception might be Gapinski himself, although as noted, his 1988 related study of the effect of tourism on performing arts demand in London failed to find cross-price (or even own price) effects.

arts (and even more so the visual arts) would seem to represent the quintessence of differentiated products. Yet, the challenges in developing adequate databases seemed to focus early attention in arts demand and audience studies on more measurable variables and away from the problematic issues of capturing arts quality or production differentiation effects. Therefore, Throsby's attempt to systematically address this issue (1990; a reprint of a 1982 paper) in a study of three Sydney theater companies over four years represented an important step in filling this void. He developed both an *objective* measure of individual plays (repertoire classification), and so-called technical variables (standards of source material, production, acting, and design) that actually depended upon the *subjective* assessments of press reviews (as translated into a 1-5 cardinal scale from very poor to very good). This objective versus subjective distinction is a useful way to categorize later efforts to test for quality effects on arts demand.

Of course, the ultimate way that consumers react to any objective characteristics of plays, or outside subjective assessments of their quality, can be viewed as subjective in the sense that the effects on behavior can most easily be viewed as affecting marginal rates of substitution (i.e tastes) rather than through any effects on constraints (although a Stigler and Becker, 1977, framework could translate this into relative shadow price changes and hence constraint variations). Nevertheless, there is a clear distinction between a dummy variable equal to one if the play was written before 1900 (Throsby's definition of a "classic"), and a variable constructed by some weighting of often conflicting press reviews (or in the future, perhaps a weighting of press reviews with internet blog chatter). Throsby (1990) also introduced an innovation that surprisingly has not been replicated, i.e., the aggregation of his quality variables into what might be considered a single multidimensional rather than a series of unidimensional quality measures. In fact, while he had limited success with any one of his individual quality measures, it was his aggregation of the technical standards variables that yielded his strongest results. Others have, of course, subsequently included multiple individual quality variables (see especially Urrutiaguer, 2002, below) but have not aggregated them into a single variable with its own estimated coefficient as did Throsby.[124]

There is another critical distinction in the arts quality literature: whether the primary focus is on a time-series or pooled analysis of the quality of a large number of individual plays, ballets, operas, or symphonies performed by a small group of arts organizations, or on the overall quality of a large number of arts organizations themselves. Two things are clear: (1) the most studied art form by far is theater (Throsby, 1990; Jenkins-Austen Smith, 1987; Dobson and West; 1989; Abbé-Decarroux, 1994; Corning and Levy, 2002; and Urrutiaguer, 2002; with Krebs and Pommerehne, 1995, a mixed case that primarily focused on theater but with a database that also includes opera and other art forms; and (2) the overwhelming focus is on attendance per performance for a small number of organizations related to

[124] A slightly different use of the uni versus multi-dimensional distinction is to treat the focus on only the repertoire, in particular the relatively common scaling of that repertoire along some version of the single criterion of highbrow versus lowbrow (see the listing below) as a unidimensional approach, in contrast to the inclusion of both a repertoire type variable along with some scaling of drama/music critics, programmers or even public granting agency evaluations, which can be called multidimensional. An unpublished anonymous manuscript under review makes this distinction. Using this definition, Throsby (1990) set the standard for the use of a multidimensional approach even if he had never also included his aggregated quality variable as described below.

quality variables applied to the individual repertoire as opposed to the overall quality of those organizations. This is perhaps a natural result of the Throsby (1990) model, which makes the Urrutiaguer (2002) extension of that model to a cross-sectional analysis (using data for two years) of the overall quality of 87 French public theaters an especially novel contribution. Interestingly, the few studies that did not focus on theater (Greckel and Felton, 1987 on 2 music institutions in one city; Felton, 1989 on opera; and Luksetich and Lange, 1995 on symphony orchestras) primarily used non-Throsby type variables that did apply to the organizations themselves (the overall artistic budget in the case of Luksetich and Lange; summary statistics such as the number of performances or the number of programs, or totally unique variables linked to personnel or venue relocations in the case of Greckel and Felton). Only Felton (1989) used a non-theatrical programmatic quality variable (a measure of the popularity of individual operas).

The Throsby (1990) model postulates a subsidized nonprofit theater management choosing price, season length, and quality attributes of its productions, so as to maximize a utility function containing those quality attributes and the percentage of seats in its venue that are filled with paying customers. The budget constraint requires that expenses equal the sum of earned (ticket revenue) and unearned (subsidy) income. Specifically:

(28) $Y_s = f(S, C)$,

with Y_s = number of available seats per time period, essentially the supply equation;
S = season length; and C = seating capacity of the venue; and hence $Y_s = S\,C$ for a single season in any one location.

(29) $Y_d = f(P, S, C, q)$,

the demand equation, with Y_d = number of paid attendance per time period, with $L = Y_d / Y_s$ defined as the load factor, which is the percentage of the capacity filled each time period. P = average price per seat; and q = n-vector of quality characteristics.

Data were available from three Sydney theater companies regarding total paid attendance, average real price, season length (defined as number of performances), venue capacity, and types of productions presented. For each theater, the following equation was estimated:

(30) $Y_a\,S = f(P, C, q)$,

where Y_a = paid attendance per performance, which when multiplied by S (the number of performances per season) yields a dependent variable = total season paid attendance.

The key innovations were in generating the variables to include in the quality characteristics vector. Five characteristics $q_1 \ldots q_5$ were defined as repertoire classification, standard of source material, standard of production, standard of acting, and standard of design respectively. The repertoire classification variable, q_1 could be defined using objective criteria based on four groupings of plays that would be essentially noncontroversial: A = a"classic" written before 1900; B = written after 1900 by a well-known author (from the audience perspective); C = written after 1900 by little or unknown authors

(from the audience perspective); D = entertainment, revue, and musical. Class D was defined as the omitted benchmark if all three other repertoire classifications enter the equation (as seen in Table 16, this applies only to the Nimrod theater, theater 2), and a dummy variable was created for each of the A, B, and C groupings which was set = 1 if a play fell into that particular class, and 0 if it did not.

The development of variables q_2 through q_5 was more challenging and was based on an assessment of the "subjective" opinion of press reviews defined as how well any play met high standards defined over those four "technical" dimensions. A cardinal scale 1 to 5 was created with 1 = very poor; 2 = poor; 3 = fair/average; 4 = good; and 5 = very good. Importantly, he also summed the q_2 through q_5 variables to obtain a single "composite standard" (the Throsby term, p. 73; or a multidimensional standard as defined above). This was rationalized as an attempt to overcome some of the variability in individual assessments, but can be justified on its own merits as reflecting something akin to the overall impression that a play would make on a viewer who may not even be thinking in terms of the four separate criteria. This entirely separate variable (defined as "sum" = Σq_i, for i = 2 to 5) was substituted for the individual q_2 through q_5 variables in an alternative specification of the model for each of the three theaters. While Throsby himself viewed this analysis as exploratory and preliminary (and the results were mixed), the influence of these estimations warrant full reporting in Table 16, although coefficients are rounded to two decimals and the column headings are slightly modified compared to the original Table 1. Except for the repertoire dummies, the double-log specification was used.

Table 16
Demand Function Estimates for Three Sydney Companies, 1974-1978
(From Throsby, 1990, Table 1)

		Repertoire Class					Technical Standard					
T	Con	Price	Cap	Cl A	Cl B	Cl C	Mat	Prod	Act	Set	Σ	R^2
1	1.67 (3.2)	-0.41 (-0.7)			0.04 (0.7)		0.18 (0.7)	-0.09 (-0.4)	0.90 (2.2)	0.21 (0.6)		.21
1	1.14 (2.0)	-0.20 (-0.3)			0.03 (0.5)						0.87 (2.1)	.21
2	-0.85 (3.3)	0.66 (1.9)	0.92 (11.4)	-0.01 (-0.1)	-0.04 (0.7)	-0.12 (2.2)	0.12 (0.8)	0.20 (1.1)	0.20 (1.1)	0.30 (1.8)		.51
2	-1.38 (5.1)	0.58 (1.9)	0.94 (13.2)	-0.04 (0.6)	-0.05 (0.9)	-0.12 (2.3)					0.88 (4.2)	.51
3	0.43 (1.3)	0.30 (0.8)	0.63 (5.9)	0.06 (1.2)	0.07 (1.6)		0.06 (0.4)	0.04 (0.4)	0.04 (0.4)	0.04 (0.3		.71
3	0.31 (0.9)	0.28 (0.8)	0.63 (6.2)	0.06 (1.7)	0.07 (1.8)						0.21 (1.3)	.71

Notes; Theater (T) 1 = Ensemble (180 seat theater-in-the-round in a converted boat shed in a harbor-side suburb); 2 = Nimrod (300 seat converted factory in inner suburbs; and 3 = Old Tote (principal state drama company in several venues; already was closed when the study was completed); Con = constant

term; Cap = venue capacity; Cl (class) A, B and C are as defined in the text prior to the table; and the technical standards of source material (Mat), production (Prod), acting (Act) and design (Set) are the q_2 through q_5 variables. Absolute values of the t-statistics are in parentheses.

Since only the Nimrod theater (theater 2) offers plays in all three of the "non- popular" (i.e. class D) repertoire classifications entered as dummies, its results regarding those three types of plays should be interpreted relative to entertainment, revue and musical plays. Its audiences reveal a strong distaste for class C plays (those by little known authors), but neither classics nor twentieth century plays by well-known authors had significant effects. The type of play also had no effect on Ensemble audiences (theater 1), but Old Tote audiences reacted favorably to both classics and well-known plays relative to those by little-known authors (type C, the omitted base case for theater 3). Thus, there is some evidence that the type of play is an important variable to include in theater demand equations.

There were also mixed but generally supportive results regarding the more subjective rankings of the four technical performance criteria (whose coefficients could be interpreted as elasticities, but Throsby is wary of pressing that interpretation, p.76). The most noteworthy finding is that for all three theaters, the aggregated quality variable generated much more statistical significance in the positive coefficient estimates than for each quality variable entered separately (although still not significant for theater 3, the Old Tote). This composite (or multidimensional) quality standard effect was expected by Throsby, although he hastened to warn against any suggestion that "the full impact of a production could be properly measured simply by the arithmetic sum of its component parts even if the parts were adequately measured" (p. 73). The weak results for the Old Tote possibly reflect the high proportion of subscription seats sold by that theater, producing what Throsby called a "captive audience" effect (p. 75).[125] Considered individually, the standard of acting has by far the strongest effect on the Ensemble theater (theater 1), with set design dominating audience choices for the Nimrod (theater 2). Throsby finds this first result fully consistent with the Ensemble's known commitment to acting (p. 75). Taken as a whole, these "tentative and qualified " findings regarding both objective and subjective quality variables were viewed by Throsby as confirming "unambiguously" the importance of qualitative variables in performing arts demand and supply decisions (p. 81), a view seemingly shared by other cultural economists.[126]

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[125] This is reminiscent of the demand implications for the role of quality of the Hjorth-Andersen (1992) suggestion that if subscription sales dominate total ticket sales (as he found in his forecasting equations for Danish theater, see the discussion below related to subjective quality variables), the financial success of a whole season is known before it even starts.

[126] In addition to the widely varying R^2s for the three equations, the primary discordant note was in the behavior of the ticket price coefficients, not statistically significant and with conflicting signs for the Ensemble and the Old Tote, but positive and significant for the Nimrod. Throsby suggests that this reflects a demand shift for the Nimrod during a time that the real price of admission were only gently rising due to the Nimrod's policy of keeping prices low to encourage audience development rather than commercial success (Throsby 1990, p. 75). Of course, this justification is an extension to the positive elasticity case of the "identification" problem regarding estimated negative price elasticities being biased downward by the pricing policies of performing arts firms that was fully discussed above in section 3.1.2.

Following Throsby (1990), the inclusion of some form of both objective and subjective measures of program classification into arts demand studies has become relatively common, although the results continue to be mixed. These approaches and results are reported below, beginning with the objective criteria results (summarized in six numbered paragraphs), followed by two numbered paragraphs summarizing the subjective criteria results. The especially significant multidimensional (see fn. 124) contribution by Urrutiaguer (2002) is described separately.

Description of Objective Criteria Results:

1. Jenkins and Austen-Smith (1987) had only limited success in finding a positive effect on English provincial theater attendance of "less esoteric" programming (defined as comedies, thrillers and musicals, in contrast to so-called serious drama). While the effect was positive and statistically significant, it was not especially economically significant. He estimated that an increase in the mix of less esoteric programming from 50 percent to 60 percent would increase demand by only one percent. Furthermore, the mix of programming had minimal effects on the organization pricing equation and on the Arts Council and local grants equation in his simultaneous system, and he could find no systematic endogenous determinants of the program mix, concluding that it is essentially a random variable (as least when defined in highbrow versus lowbrow terms).

2. Greckel and Felton (1987) did not attempt to characterize the content of programs, but included even more objective measures without success. Their dummy variable to capture the shift of the Louisville Symphony Orchestra to a full-time orchestra, and variables for the number of programs, and the number of performances (both intended to reflect desirable product variety) failed and were dropped from their reported equations. Two variables that did work well were idiosyncratic to the Louisville Orchestra: (1) a dummy variable to capture "unpopular conductor" was introduced to capture the negative effects of the frequent absences of the primary conductor during his final two years, and the unpopularity of his successor; and (2) a concert hall capacity variable with the unique interpretation of capturing the positive effect of the shift of the orchestra to new and far superior facilities that also included a larger hall (a perhaps questionable measure of this effect compared to the use of a dummy variable, which they also considered and rejected due to unique timing of the move midway through the second to the last season in their 10 year time series). Even though the derivation of an unpopular conductor elasticity of demand (-0.301) was a first and perhaps a last in the literature, Greckel and Felton express caution in putting to much emphasis on that result inasmuch as its exclusion in an equation with ticket price, real per capita income, and concert hall capacity also performed well in explaining the variance over time in audience behavior (p. 66).

3. Dobson and West (1989) found no significant effect on Atlanta theater audiences of the type of play or the day of the week of the performance. Similarly, Felton (1989) found statistical significance for her opera popularity ratings variable in only one of her opera company equations (the Kentucky Opera Association), and concluded that in other cities programmatic content had little effect on subscriber attendance. Luksetich and Lange (1995) had no success with their attempt to link total expenditure per symphony performance to attendance via a quality argument (see 3.2.1).

4. While Abbe-Decarroux (1994) also includes a subjective press reviews variable (see below),

he perhaps follows Throsby (1990) as closely as anyone in introducing eight quite objective dummy variables (although not aggregating them into a single variable). He also estimates his seven year (64 productions) Geneva theater demand function for both full-price and reduced price audiences (as well as reporting the total demand equation). Some variables performed well; others did not. "Home productions" (those produced by the institution itself) had significantly negative effects on per performance admissions (explained as due to the higher frequency of such plays being performed), while well-known authors, producers and casts had separately positive and generally statistically significant effects across all equations. But surprisingly, the fame of the play, and whether it was a classic (written before 1900) or a modern play (after 1990; deceased author) had no real effect on either audience segment, but audiences clearly rewarded novelty, with "atypical" plays (circus, revue, collection creation or other) having strongly positive effects on per performance attendance. Contemporary play (written after 1990; living author) was the omitted type of play control dummy. While Abbe-Decarroux (1994) has previously been discussed as providing some of the strongest evidence for price elasticity differences across price ranges (- 0.31 for full-price and not statistically significant, but - 2.45 and highly significant for reduced-price customers), the effects of these objective quality measures do not significantly differ in economic importance across those two customer groups. While statistical significance levels sometimes differ, the estimated coefficient differences are not significant at the 0.05 level (p.106).

5. Krebs and Pommerehne (1995) considered but rejected using "performances per stage" to capture the scope of supply, and also rejected approximating a productions' average run length by constructing a total performances per number of premiers variable. Instead they tried to capture the popularity of various arts productions by measuring the "share of productions with many performances out of all performances" (p. 25). Specifically, they construct a proxy for highbrow versus lowbrow theater productions by measuring the "ratio of works with more than 75 performances to all works played in a season," which they view as a proxy for more popular lowbrow productions that would survive longer than highbrow plays.[127] Given the recognized weaknesses of this construction: (1) 75 performance threshold is arbitrary; (2) some highbrow plays can be quite successful with lay audiences; and (3) the partial endogeneity of the variable, "since live performing arts demand influences the success and therefore the popularity of the work" (p. 25), it is remarkable that this variable performs fairly well - a positive coefficient, although not quite statistically significant (unless income is omitted from the equation). Expressed in elasticity terms, this 0.10 "lowbrow" elasticity of arts demand implies that a 10 percent increase in the share of such works will increase paid attendance per capita of the population by one percent. This lowbrow inelasticity result is consistent with the low "less esoteric programming" elasticity result in Jenkins and Austen-Smith (1987) and suggests that even when this dimension of repertoire quality has an effect on attendance, it is not as high as has been generally expected. However, the since the Abbé-Decarroux (1994) definition of "atypical play" seems to include some more popularized rather than eccentric content, its strong positive effect in that study is potential counter-evidence.

[127] Again, Kelejian and Lawrence (1980) play their customary role of suggesting, but not testing, a potentially useful variable. In this case, their more simply defined "number of different Broadway shows in any one year", which would increase as individual shows remained in theaters for fewer performances, was designed to proxy shorter runs and hence an implied lower quality. . They also failed to find data to implement their proportion of shows that are musicals, and subjective average evaluation of critics quality variables.

6. Corning and Levy (2002) introduced many objective quality variables (as well as some subjective measures discussed below), and found evidence that programmatic content (labeled as comedy, musical, drama, or the musical "Tommy") had limited effects on single-ticket theater attendance, varying notably across individual theaters and strongest for the unique case of Tommy, which in the case of one Southern California theater location would increase per performance attendance by over 200 in contrast to a performance of Shakespeare *ceteris paribus* (p. 230). Other musicals also had positive attendance effects, but the comedy dummy variable was positive and significant no more frequently than the drama dummy (i.e. in only one, although, differing venue equation). They also found more evidence than did Dobson and West (1989) that scheduling has some effect, including a dizzying array of dummy variables to distinguish performances by evening, weekend (to capture weekly seasonal effects), prime (Friday and Saturday nights), preview, and opening (matinee was the omitted variable) that require some creativity to interpret. For example, the evening variable alone is supposed to capture the effect of a weekday evening performance in contrast to the baseline weekly matinee, but the prime and evening variables together are to capture the effect of a Friday or Saturday night performance relative to the baseline. Then, the weekend variable represents the differential effect of a weekend matinee. But there is more - a separate dummy variable is entered for every month of the year to address seasonality effects in a more detailed way than with just four seasonal measures (June is the omitted baseline).[128] Of all these variables, the weekend dummy has the strongest positive effect for all three theater locations, followed by the evening dummy and the measure for Friday and Saturday nights (prime), significant at the 0.05 level for two of the three locations. Somewhat surprisingly previews and openings had inconsistent and relatively weak effects, and the monthly dummy variables (relative to June) were rarely helpful (although in the few cases in which a month was statistically significant, it had a positive coefficient, with the only consistent finding the obvious one that the location having a targeted outdoor summer season had strong attendance increases during July through September).

Perhaps the most fascinating Corning and Levy (2002) "objective" variable in a study of quality effects is one that would seem to pre-judge the issue: "Flop" is a dummy variable = 1 when the average total attendance at a first location prior to a play shifting venues was less than 50 percent of capacity (38 of 119 productions in the sample period ran in one location and then quickly moved). Remarkably, it was positive in two venue equations (statistically significant in one), and only negative and significant in the outdoor summer season venue. The fact that seemingly clear evidence that a play is a failure cannot reliably have later negative effects on attendance, may be the best evidence of the challenge in capturing the effects of quality in arts demand studies.

In contrast to these efforts to capture objective quality effects, some subsequent studies focused on the determination of subjective perceptions of quality, typically focusing on the role that various expert critics have on the perceptions of the lay public. In contrast to Throsby (1990), who translated those subjective press reviews into a five point scale over four so-called technical criteria, and then estimated those four individual effects *as well as* the effect of their aggregation, most of these efforts have been unidimensional.[129]

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[128] Carson and Mobilia (1989) found such effects when using the four seasons rather than the twelve months.

[129] Tobias (2004) shifted the art critic focus back one step by examining the determinants of

Before listing these limited results, it should first be noted that the Lévy-Garboua and Montmarquette (1996) model (discussed in 3.2.3) represents perhaps the pinnacle of the subjective approach by essentially extending the adage "I know nothing about art, but I know what I like" to the case of consumers who do not even know what they like, but are capable of discovering their own tastes and definition of quality through an adaptive process of learning- by-consuming. By contrast, while not explicitly addressing how artistic quality affects arts demand, Hjorth-Andersen (1992) indirectly offered evidence for a "minimal-learning" model with at least no-one period quality effects when he reported simple time-series forecasting results for Danish theater indicating that total season attendance could be quite accurately estimated using only data on season subscription sales. His conclusion that the success of the whole season can thus be known before it even begins, does not preclude subscriptions being sensitive to the advanced announcements about programmatic content (a common "objective" quality variable), nor does it preclude future subscription volume changing with the success of a theater in implementing that program. But it suggests that art critic reviews, word-of-mouth assessments, or even disappointing personal experiences during a season may have little or no affect on non-subscriber sales.

While the Lévy-Garboua and Montmarquette (1996) analysis has been viewed as a success in incorporating quality considerations (essentially subjective as determined by consumers themselves through experience), it is more clearly a success in the study of taste cultivation and arts demand dynamics (see 3.2.3). In fact, as noted previously, they did not really include any quality variables *per se* into their equations. Those studies that did include variables designed to capture the effects of subjective quality judgments are summarized below.

Description of Subjective Quality Results

1. Abbé-Decarroux (1994) supplemented his four repertoire and four "fame" (author, play, producer, cast) objective variables with a qualitative press review variable scaled nearly identically to Throsby (1990), adding a sixth category for "excellent." This variable was positive and highly statistically significant in both full-price and reduced-price equations.

2. Corning and Levy (2002) also supplemented their inventory of programmatic, scheduling and seasonal variables with a newspaper review variable on a five point scale (adding some additional detail to the parsimonious Throsby (1990) ratings; their Table II, p. 227). Due to some format changes in the two publications used in their analysis, some productions were not reviewed at all, which was registered with a "noreview" variable. The quality of such press reviews had a positive and statistically significant effect on per performance attendance in only one case (the summer outdoor festival venue). Interestingly, the total absence of any review of a production actually had a positive effect in each of the three venue equations, with reasonably high although not statistically significant t-statistics (at the 0.05 level).

Finally, Urrutiaguer (2002) provides the most important extension of the Throsby (1990 analysis by using four types of quality variables in his study of the French public theater: (1) a variation of the

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those expert opinions, finding mixed effects of organization artistic spending on generating favorable judgments, but he did not conduct any arts demand analysis.

four Throsby (1990) type objective repertoire quality measures (defined somewhat differently, adapted to the French theater, and converted into theater rather than individual play terms); (2) a sophisticated variable constructed from press reviews; (3) a variable designed to capture the unique French esteem that is accorded to public theaters having directors who also manage a theatrical institution; and (4) two dummy variables to capture the public sanction given to public theaters by their ability to win both state and local subsidies. Because the methods used by Urrutiaguer are almost as interesting as his actual empirical results, they are described in detail.

He modifies the Throsby (1990) model in two ways, one somewhat technical, but the other more important conceptually (while adopting most of the Throsby notation). The technical adjustment is in changing the dependent variable from a measurement of seasonal attendance for each year (i.e. per performance attendance multiplied by the number of performances per season) to per performance attendance by dividing the Throsby dependent variable by the number of performances (S in both models). Urrutiaguer justifies this in his case as necessary to avoid heterogeneity in the size of theatrical institutions among his much larger database of 87-104 theaters, and to reduce the risks of heteroskedasticity (p. 187). More fundamentally, he notes that when he applied his model to the demand for individual shows in 1995, the adjusted R^2 was quite low (about 0.13; the Throsby R^2 s ranged from 0.21 to 0.71). He suggests that the weakness of this result should not be surprising inasmuch as the theater itself rather than just individual shows is a "much more appropriate" level at which to examine variance in demand, which can be caused by an organization's program, auditorium comfort, and the overall image of an individual theater.

He makes three additional basic modeling points prior to operationalizing his quality variables: (1) Audience loyalty as a result of a theater's overall reputation for quality is important and could be measured as the rate of attendance from year to year using the ratio between the paying audience and the number of seats available (which is the Throsby load factor, $L = Y_d / S\,C$, where C is seating capacity); however, the lack of precision about theatrical capacity of the larger number of regional theaters led him to choose a lagged endogenous variable approach defined as the number of paying customers per performance in the previous year $(Y_d /S)_{t-1}$. (2) While price and volume variables can be considered continuous, judgments on quality would most likely have non-linear effects on demand since "bad and good assessments weigh more than medium ones on potential audiences" (p. 187). Hence he finds dummy variables theoretically appropriate, not just convenient, to capture such effects. (3) Despite the fact that his regional theater database is dramatically larger than Throsby's three theater study, he is concerned about this being too limited to generate reliable data for only one year, so he combines his 1995 and 1996 data and adds a time dummy variable *a* that equals 0 in 1995 and 1 in 1996. The resulting estimation equation is (for time *t*):

$$(31) \quad (Y_d /S)_t = ct + \propto p_t + \beta S_t + \chi C_t + \delta_0 (Y_d /S)_{t-1} + \sum_{i=1}^{n} \delta_i q_i + \tau a + e_t$$

where (Y_d /S) is per performance paid attendance, ct is the constant, e_t is the disturbance vector, p is price, S is the number of performances, C is theater seating capacity, a is the time dummy with 1996=1, and the q_i vector refers to dummy variables for quality, which are entered individually only without the alternative Throsby composite specification of each summed into a single variable. Except for the quality dummies, all variables are measured in natural logarithms.

The four repertoire classifications (q_4) are updated variations of Throsby (1990) adapted to France: with A = classics whose author died before the twentieth century; B = plays written before 1980 by an author who died in the twentieth century; C = plays in French by a still living author, or by a dead author but published after 1980; and D = plays not in French by an author defined as contemporary. An important modification is required to make the resulting dummy variables applicable to a theater rather than an individual play. Hence, each of the four dummies applicable to a theater's repertoire is defined as = 1 if "the part of performances programmed by the institution and belong to A [or B, or C, or D] is more than 10 percent higher than the overall average, 0 otherwise" (p. 189).

A theater reviews variable (q_1) is based on an analysis of the opinions published in the newspapers *Le Monde* and *Liberation* and the magazine *Telerama*. Urrutiaguer (2002) then begins in a way similar to Throsby (1990 by assigning a numerical score to such reviews (although using only 3 rankings rather than 5): + 1 if positive comments are emphasized; - 1 if the paper/magazine "highlights disparaging remarks" about the show; and 0 for a largely balanced review. But nothing remains simple after that, as the reviews of individual sources are first weighted by "readership impact" (defined as the average number of readers per issue multiplied by the number of issues in which a drama review appeared), and an adjustment is made for the effect of missing reviews using Heckman's two-step procedure (1979) to correct for the effects of sample selection (Urrutiaguer, pp. 189-192). Then the resulting scores of the drama reviews regarding particular shows must be aggregated to apply to an individual theater. This is done by creating the variable $q_{1t} = (\Sigma m_{t\,h}\, s_h) / S$, for all h = 1 to k, where S is the number of performances of *p* shows put on by a theater, of which k were reviewed and given a score of $m_{t\,h}$ for show h (present s_h times). This constructed variable is then interpreted as the value attributed by critics to the theatrical production of any institution for year t. The final step is to recognize that unambiguous reviews have more impact than those with "nuances," and any dummy variables entered into the estimating equation should reflect this. Thus, the variables q_{1wt} and q_{1ht} are set equivalent to poor or absent reviews and good reviews respectively, and an iterative search procedure run to generate the thresholds that optimize the specification of these variables in both years. The poor or absent review dummy was consequently set = 1 if $q_1 < 0.009$ and 0 otherwise, and the good review dummy variable was set = 1 if $q_1 > 0.2$ and 0 otherwise.

Urrutiaguer (2002) develops a "weak and high centrality" measure to capture the potential effects on potential audience choice of the weight in a theater's programs of shows produced by what he calls "directors-*cum*-managers." Since French audiences seem to attribute higher prestige to directors who also manage a theatrical institution, and a manager would likely prefer to select directors who have a similar status to that manager to take advantage of their artistic reputation, Urrutiaguer constructs a matrix of performances produced by each theatrical company *i* and presented by others in order to construct the variable $q_{2t} = \Sigma s_{i\,j} / (g-1)$, over all j, for which $s_{I\,j}$ is the number of performances that theater each theater bought from the other theaters *j*, and g is the number of selected organizations in the "network" (restricted to the 104 institutions in his sample). As with the drama review variable, this centrality variable should be more powerful at the extremes (weak or strong rather than medium), so thresholds are again estimated to generate the best fit, yielding for the strong measure a value of 1 if q_2 <15, and 0 otherwise, and for the weak measure a value of 1 if q_2 >36, and 0 otherwise.

Given the complexity of the strong and weak press review dummy variables, and strong and weak directors-*cum*-managers centrality quality dummies, it is a relief that the fourth and final quality

measure is more straightforward. Assuming that public recognition of a theater via tax-financed subsidies is a quality proxy, this dummy value = 1 if the yearly growth of subsidies is more than 8 percent, and =0 otherwise. Two such dummies are defined, one for state and one for local subsidies.

Despite the sophisticated technical innovations in constructing the drama review and centrality dummy variables, and the important conceptual shift toward a focus on the theater rather than the individual play, Urrutiaguer (2002) originally had limited success in generating significant results for his quality variables, consistent with the frequently mixed experience of prior studies (see above) in finding support for such variables (including Throsby's own failure to find strong support for the subjective technical standard variables when considered individually in contrast to being aggregated into his composite technical standard variable). Urrutiaguer then tests the hypothesis that different portions of theater audiences have contrasting perceptions of reputation, especially in how they weigh the reputations of drama critics and those of artistic directors. Thus, the full theater sample was segmented into two groups: a Group I of 40 institutions for which the audience shares the scale of judgments of drama critics and a Group II of 47 institutions whose audience have more trust in the artistic reputation of directors-*cum*-managers (and who either ignore or do not share the judgments of theater critics).[130] Therefore, the signs on certain estimated quality coefficients were expected to differ between Group I and Group II regressions. Specifically, in Group I regressions the effect of weak press reviews should be negative and strong press reviews positive. The effects are more complex regarding the director artistic reputation variables (weak and strong centrality). Since the audiences of Group I theaters are disinterested in such reputations, there should be negative sign on the high centrality dummy variable and a positive sign on the low centrality dummy. The signs should be reversed for Group II theaters.

The effect of this disaggregation into two groups is dramatic (as has been shown to be true of some other institution or audience disaggregations efforts in terms of the effects on price and income elasticities). The adjusted R^2 for both groups is very high (> 0.824, with the F statistic for Group II being especially high at 65.08; 38.12 for Group I). While the price coefficient is enigmatic, positive in both equations and strongly significant for Group I,[131] and only one objective repertoire quality variable was significant (strongly negative for foreign contemporary plays for Group I), the other quality variables generally performed well. Also, consistent with other studies using a one-year lagged dependent variable, that effect is strongly positive in both equations (see 3.2.3), as is the venue capacity

[130] To construct these two groups the shows performed by each institution were separated based upon whether they had been reviewed or not, and the paid attendance and number of performances for each of those two cases was registered. The starting point for building the two groups was the observed correlation between attendance per performance and the critics' opinion, which was positive or negative depending on the shows reviewed in the papers/magazine. Using OLS regression on the basic estimation equation (given above in the text) the classification was refined by trying to find the group for which each institution optimized the model, classifying any problematic institutions (those that weaken the estimated parameters in both groups) into the group in which this weakening effect was more limited. See Urrutiaguer (2002, pp. 195-196).

[131] Consistent with standard economist "religious" practice on this issue, such perversity is explained as price being itself a proxy for quality (p. 199), as was true of other such findings in the arts demand literature (e.g. Jenkins and Austen-Smith, 1987; and Huntington, 1991).

coefficient (although stronger for Group I). The regressions confirm the expected opposition of the signs on the media and art director reputation variables, except for the weak centrality variable, with both groups have highly significant but opposite coefficients on the drama reviews variables. This suggests that the effect of drama critics can be negative as well as positive, at least for some segments of the audience, which is a more encouraging result than the lack of significance that such variables have sometimes had in other studies (including Urrutiaguer, 2002, prior to segmenting the theater sample by audience reputation perceptions). Despite the delay relative to the appearance of Throsby's work (as early as 1983), Urrutiaguer (2002) significantly advances our understanding of the arts quality issue, even if he did not incorporate Throsby's aggregated composite of different technical standards variable into his extensive analysis.

3.3 The Role of Socioeconomic Factors versus Life- Style Determinants of Arts Demand

Andreasen and Belk (1980; see also 1981) is best known for asserting that life-style factors, attitudes and socialization to the arts are more reliable predictors of attendance (at least for theater and symphony in the southern U.S.) than are demographic and socioeconomic variables. Such variables appear not only in large-scale surveys that explore aspects of audience segmentation using primarily non-regression statistical techniques, but also in formal econometric models where concerns about multicollinearity and other specification constraints may limit the number of such variables that can plausibly be incorporated into the analysis. In fact, a notable feature of Andreasen and Belk's provocative assertion is that it was not only founded upon the derivation of statistically significant univariate correlations of 56 independent variables with the likelihood of attendance, but was further confirmed using step-wise regression analysis.

However, a very interesting feature of the study is important in evaluating the results: the focus was on "marginal attenders" defined as those who do not frequently attend either theater or symphony events but who "might be enticed to do so" (p.113). Therefore, those deemed to have almost no likelihood of attending either the theater or a symphony concert in the future were screened out of the telephone sample, while conversely, already frequent attenders were "intentionally undersampled."[132] Thus, while all arts demand studies are examined in part for their implications about future behavior, they are usually derived from evidence about observed past behavior. Andreasen and Belk (1980) directly attempt to determine what arts organizations should emphasize in their efforts to build future audiences.

Of course, the multicollinearity problems are severe among the 56 Andreasen and Belk independent variables that include all standard socioeconomic determinants (education, gender, income, occupation, and age), but also variables as diverse as six "general life-style" dimensions (e.g. optimism/hedonism and traditionalism), six "leisure life-style" group characterizations (e.g. passive homebody, culture patron, inner-directed self-sufficient), life-cycle variables, and various socialization proxies.[133] Therefore, only six variables in the step-wise regressions were found to add significantly (at

[132] The authors state that they interviewed only one-half of those who had attended three or more theater or symphony performances in the previous year (Andreasen and Belk, 1980, p. 113).

[133] Levantal (1989) includes a related list of six "psychographic factors" including "eclecticism" and "independence of opinion" along with "determination to see a particular play."

the 0.05 level) to the prediction of theater attendance and five to the prediction of symphony attendance, with only modest adjusted R^2 values of .279 and .289 respectively (Andreasen and Belk, 1980; Table 2).

However, despite those limitations, the essential results were striking: Not one of those standard socioeconomic variables was a significant predictor of future arts attendance when controlling for attitude, and general and specific life-style factors. Instead, what mattered most as positive predictors of future attendance in the theater equation (based on the standardized beta weights) were (1) attitude toward attending the theater; (2) being a "culture patron," a leisure life-style characteristic; (3) interest in live theater when growing up; and (4) theater attendance during the past year, with the most important negative predictors being two of the "general" life-style characteristics: (5) "traditionalism," and (6) "self-confidence/opinion leadership." There were no significant negative predictors of symphony attendance, and quite similar positive predictors: (1) attitude toward attending the symphony; (2) culture patron; (3) "socially active," a leisure life-style trait; (4) interest in classical music when growing up; and (5) symphony attendance during the past year. While these results again confirm the importance of previous attendance as a predictor of current attendance, as shown in all of the more sophisticated dynamic models regardless of the particular mechanism or interpretation (from the static adjustment lag model of Houthhaker and Taylor, 1970, to the learning-by-consuming mechanics of Lévy-Garboua and Montmarquette, 1996), the elimination of variables like education, income and age as significant independent variables was novel.

There are certainly weaknesses in the Andreasen and Belk (1980) study, generally recognized by the authors. Telephone sample techniques usually generate selectivity biases; the study was limited to four southern U.S. cities with an eventual usable final sample of 1,491; and self-reported attitudes and perceptions can be unreliable. Furthermore, the decision to under-represent frequent arts attenders may be viewed as partially responsible for the poor showing of the education, income, and age variables. However, such a convenient explanation is unlikely inasmuch as the combination of that selectivity bias in telephone surveys and the decision to totally eliminate anyone with a "zero probability of attending arts events" generated a sample that was younger, more female, and with higher education and income than the general population in the surveyed cities (p. 113). Since highly educated females with relatively high incomes would certainly be an excellent target arts audience (and even the youthfulness of the sample cannot be reliably viewed as negative), the Andreasen and Belk (1980) results regarding the poor performance of education, income and gender are hard to dismiss.

But have those findings been replicated? There is certainly evidence that the basic demand model for the consumption of arts events A = f(own price, prices of substitutes and complements, income or wealth, education, age, arts quality) can be usefully supplemented by the addition of variables that either serve as proxies for unexplained taste variations, or as sources of shadow price differences in a consumer as producer model. Even a standard arts demand "taste" variable such as gender, where female arts participation and consumption rates have long been recognized as differing from those of males (e.g. Table 1, and other previous citations), the reasons for such differences are no doubt subject to intricate influences of socialization more so than in the case of "age," where reasons for differential

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He finds that having an existing subscription was the primary reason for attendance for 55.7 percent of those audience members surveyed, with only 19.7 percent determined to see a particular play. However, among the subsample of single-ticket holders, 33 - 38 percent (depending on the audience surveyed) attended to see that particular play.

arts consumption have at times focused on human consumption capital accumulation or attitudes toward risk in arts programming (e.g. Abbé-Decarroux and Grin, 1992). Such socialization forces should be at least as complex when incorporating other variables such as race, ethnicity, sexual orientation, and religious affiliation.

Some studies have cited important socialization effects within the family (e.g. Ganzeboom, 1989), and others have carefully distinguished between childhood arts experiences with parents in contrast to those obtained in school (e.g. Abbé-Decarroux, 1995; see also Morrison and West, 1986). Among the Lévy-Garboua and Montmarquette (1996) determinants are such attitudinal variables as "appreciates humanity" (which intriguingly has a negative effect on the probability and frequency of attending the theater, but a positive effect on the "satisfaction" derived from attending; Table 1, p. 36), and measures of newspaper (not significant) and magazine (a negative effect)reading habits And when one adds variables from non-regression based studies, the variety of such variables expands further. A mere sampling would include: the ticket purchasing habits of friends (Bamossy and Semenik, 1980; Kolb, 1996); years spent residing in the geographical area being studied (Ryans and Weinberg, 1978); divorced versus widowed status in addition to the more standard single versus married designations, as well as who within the family makes the decision to attend various types of entertainment events (Kaali-Nagy and Garrison, 1972; and Upright, 2004).

However, there is no real evidence that the Andreasen and Belk (1980) conclusion regarding the dominance of the socialization "error term" variables over the other standard demand variables has been replicated. There are three reasons: (1) Even Andreasen and Belk (1980) found that of there daunting list of non-traditional variables, only a very few survived the step-wise regression pruning process (as described above); (2) Studies of arguably novel "socialization" type variables have found that income, education and age are not eliminated from those equations and often perform quite well (DiMaggio and Ostrower, 1990; and Lewis and Seaman (2004); and (3) From the purely limited perspective of "explaining" the variance in the dependent variable, extremely parsimonious time-series or pooled studied sometimes do quite well without adding such so-called taste adjusting variables (Gapinski, 1984 generated an adjusted R^2 of .96 from a demand equation with only own price, income, and a constant term; although the constant term had the highest t-statistic).

This section closes with a more detailed look at both the DiMaggio and Ostrower (1990) study of racial differences and the Lewis and Seaman (2004) examination of sexual orientation and religious affiliation differences in U.S. arts consumption behavior.[134] DiMaggio and Ostrower observe that (as of the late 1980's) surprisingly little study had been done of black participation in the arts (1990, p. 753). That has changed little in the interim period. However, race has been a surveyed characteristic of the SPPA since 1982, with black participation rates in the performing arts about 50 percent that of whites in

[134] While religious affiliation has been as absent as sexual orientation from the list of independent variables in arts demand studies, Lee and Szenberg (1989) did estimate a "real per capita dollar religious book sales" equation as part of their study of American book consumption. Unfortunately they lacked any data on religious affiliation, but found that the key determining variables were size of the population in white collar occupations (and elasticity coefficient of 5.34), while the income coefficient was only 0.73. The amount of time spent watching TV had a negative effect on religious book sales (an elasticity of -3.39).

1982, nearly equal for theater and only modestly lower for art museums by 1997 (Table 3.3, Heilbrun and Gray, 2001), and then falling again by the 2002 SPPA (NEA 2004) with notable black/white differentials for all 11 of the SPPA categories (although only modestly lower for "other dance," and about 11 percent higher for jazz; Table 9). Nevertheless, it is certainly true that race and ethnicity have been nearly absent from econometric arts demand studies, with only Dobson and West (1989), Gray (2003, using data from the 1997 SPPA), and Lewis and Seaman (2004) as exceptions when using U.S. data. It is also difficult to find examples using non-U.S. data, with Trienekens (2002) applied to the U.K. being a rare exception.

Dobson and West (1989) found "ethnic background" to have a modestly negative effect on Atlanta theater attendance (but not statistically significant at the 0.05 level); Lewis and Seaman (2004) found mixed results, with "Black" being a negative and statistically significant (at the 0.05 level) determinant of classical music attendance, but with competing and not statistically significant effects on arts museum (negative) and dance (positive) attendance. The 1997 SPPA based Gray (2003) logistic regression results are of interest inasmuch as, after adjusting for age, income, education, gender, work hours, and music and art lessons, the "Black" variable coefficient is statistically significant (at 0.001) and negative for only classical music, opera, and ballet, while being positive for jazz, musical theater, non-musical theater, dance, and museum. Also, he reported *ceteris paribus* positive coefficients for "Hispanic" across all categories, negative "Asian" coefficients for all arts categories except dance and museum, and negative "Indian" coefficients for all arts categories except opera and musical theater (all coefficients statistically significant at the 0.001 level). While not all of those coefficients were economically significant (e.g. six coefficients were below 0.10 in absolute value), no other study incorporated that degree of ethnic variety.

The surprisingly weak and mixed performance of racial/ethnic variables in these few studies is noteworthy in light of the DiMaggio and Ostrower (1990) conclusion that "given the degree of racial oppression and exclusion to which black Americans have been subjected, they participate in the arts at rates and in ways remarkably similar to those of white Americans," a pattern they call "*differentiation without segmentation*" (p. 772). Their analysis is by far the most substantive attempt to address the role of ethnicity on arts participation, in part because it differentiates Euro-American from Afro-American art forms, and also because it attempts to address the reasons for any remaining differences after controlling for other determinants. Utilizing the 1982 SPPA as the data source, DiMaggio and Ostrower pose the key question: Since whites are more likely than blacks to exhibit key characteristics linked to demand for the performing arts (higher levels of education, income and prestigious occupations) is there really an independent role for race in explaining the lower arts participation rates of blacks?

Four features of their multivariate analysis are noteworthy. Firstly, while the SPPA question format never captures frequency of attendance, but only whether the respondent has gone to a particular kind of event in the previous 12 months, DiMaggio and Ostrower create an additive 0-4 scale for the performing arts consumption variable by summing the positive answers for four categories of performing arts performances (not including jazz), and an additive 0-4 scale for visual arts (exhibition) consumption. They also include a dependent variable for the watching of televison arts programming. Secondly, since SPPA questions also generate information about playing instruments, acting in stage plays, etc., they also generate a dependent variable on a 0-4 scale for performing arts production activities and a 0-6 scaled dependent variable for visual arts production activity. Thirdly, in addition to

including education and race (with black = 1) as independent variables, they are unusual in the empirical arts demand literature in using interaction variables, interacting race with five variables: urban residence, marital status (single or divorced), education, gender (female), occupation (sales/clerical), and income. Fourthly, they then regress their consumption and production dependent variables on race, education and their interaction variables using OLS, while separately employing logistic regression for the same independent variables, but different dependent variables measuring (1) jazz concert attendance and (2) jazz watching behavior on television, as well as "musical taste" dependent variables generated from the SPPA questions regarding the "enjoyment" of classical music, jazz, opera, and the combined category soul, blues or R&B.

While they do not report the performance of all interaction terms in all of the equations in their Tables 2 and 3 (DiMaggio and Ostrower, pp. 762,763), there are four major results of their empirical analysis. (1) The unique negative effect of race on Euro-American high culture arts participation is modest, but statistically significant (roughly consistent with the Gray, 2003, results reported above from the 1997 SPPA where after controlling for other variables, race alone did not have as widespread a negative effect on arts participation as suggested by the raw participation rate differentials. (2) Race effects are stronger for arts consumption than for arts production behavior, and stronger for public arts consumption than for private arts consumption via television watching, where it fact the racial effect is nearly absent - a fascinating result consistent with their view that racial discrimination may adversely affect public but not private participation in the arts and that arts consumption but not production is affected by "status competition." (3) Consistent with what would have been expected from the non-regression descriptive statistics, race (with black =1) has strong positive effects on both attendance and enjoyment measures for the non-European based art forms of jazz, soul, blues and R&B, confirming the obvious point that viewing black arts participation rates as relatively low depends in large part on one's definition of the arts. (4) The behavior of the interaction terms with race and the other control variables is a bit complex. Regarding high arts consumption, there is a negative interaction between race and educational attainment that is nevertheless small compared to the strong positive effect of education for both blacks and whites, and small negative (but statistically significant) interactions between race and urban residence, and race and being female. Regarding attending the visual arts, watching arts programs on television, or expressing enjoyment of classical music or opera, there are no significant interactions between race and the other socioeconomic variables. The combined force of small racial interaction effects for the attendance at high arts events along with no such effects at all regarding the visual arts, the high arts on television and the self-reported enjoyment of classical music and opera is to prompt an intriguing conclusion from DiMaggio and Ostrower (p. 761), i.e. despite lower arts participation rates for blacks compared to whites, the "determinants of such participation are essentially the same," suggesting the "apparent hegemony of a standardized form of cultural capital in the heterogenous U.S., as is also the case in the more homogenous societies such as France" [at least at that time].

In addition to generating these important results, DiMaggio and Ostrower conducted a detailed analysis of two hypotheses that might explain the remaining racial differences in arts participation: (1) a "cultural convergence" model by which any such differences would be expected to diminish with increased interracial peer contact, especially among the young, and with increasing education, access to prestigious occupations and income (a version of the previously discussed "Cwi hypothesis" applied to ethnicity); and (2) a "cultural resistence" model by which increased black/white economic competition creates opportunities for younger, well-educated blacks to embrace minority cultural norms (e.g. 1990,

p. 773). However, despite their best efforts, they eventually find little systematic evidence to support either of these perspectives.

Lewis and Seaman (2004), which relied upon the 1993 and 1998 U.S. General Social Survey (GSS) for data (since leisure, recreational and arts activities were addressed in those years), included race only as a control variable and did not pattern its study of lesbians, gay males and bisexuals (LGBs) after the DiMaggio and Ostrower analysis of race (1990). However, those two studies share important similarities. Just as one might suspect that a large part of the explanation for racial arts consumption differences is actually educational, occupational and income disparities, similar control variable problems (along with urban location factors and differential family obligations) complicate the effort to isolate a unique role for sexual orientation.[135] And even after establishing that unique role, Lewis and Seaman (2004) confronted a similarly frustrating problem in explaining why it exists. Little compelling evidence was found from supplemental tests for any of four explanations: (1) pure demographics; (2) an innate "gay affinity for the arts," tested by also examining arts production behavior such as "make art, play music, perform live or identity as a professional artist" in addition to estimating arts consumption equations (as did DiMaggio and Ostrower, 1990); (3) a reaction to the historical repression of homosexuality; and (4) an ongoing more welcoming environment for LGBs in arts venues than in other public entertainment environments - an explanation that was at least weakly supported.

Certainly, a major reason why sexual orientation had never before entered arts demand studies (and "sex" had always meant gender) is the fundamental problem of definition, which must be based on some version of self-reporting.[136] The GSS asks only two relevant behavioral questions (and no questions related to attraction or self-identification): the number of male and female sex partners since age 18, and whether one's recent sex partners have been male, female, or both. While Lewis and Seaman experimented with a variety of definitions (all yielding similar results), they chose the one yielding the largest sample size (5 percent, or 180 of 2,188 respondents) in order to reduce standard errors, hence coding the LGB variable as 1 for those who reported at least one same sex partner since their 18th birthday, and 0 for everyone else.

The descriptive data yielded powerfully suggestive results (their Table 1). With no demographic or other controls, substantially higher percentages of LCBs compared to straight respondents had visited or attended an art museum/gallery, or ballet, dance, classical music or opera performance in the prior year, yielding attendance differentials of between 16 and 19 percentage points, with LGBs being about twice as likely to have attended a classical music or dance performance and almost three times as likely

[135] While there is evidence that LGB's are more educated, urbanized, and more likely to be childless than heterosexuals, the common notion that their average incomes are also higher is due largely to nonrepresentative samples of wealthy gay men and lesbians. In fact, controlling for education, gay men earn 15 to 30 percent less than straight men of the same age, and the evidence on lesbian versus heterosexual women is mixed. Yet, there is indeed evidence that gay male couples have higher income (especially disposable income) than married straight couples, with lesbian couple earnings the lowest of the three groups. See Lewis and Seaman (2004, p. 525 and related citations).

[136] As noted previously, the only prior hint at this topic was the finding using Canadian data in Globerman and Book (1977) that "being male and unmarried is positively related to frequency of attendance at music and opera performances, *cet. par.* (p. 25).

to have attended a museum, musical and dance performance, i.e. 17 percent compared to 6 percent (Lewis and Seaman, 2004, p.529). Even more remarkably, using the narrowest available definition for LGBs (those who had a same sex partner within the past year and rejected the claim that "homosexual relations are almost always wrong") overall differences rose from 16-19 percent to 25 percent (their note 5, p. 529). Even after controlling for demographic and other variables, the differences between LGB and heterosexual attendance patterns drops only to 12 (museum), 10 (dance) and 14 percent (music) from the unadjusted respective differences of 17, 16 and 19 percent (p. 531).

Finally, their logistic consumption regression equations[137] revealed strong and statistically significant positive effects on attendance due to being LGB, higher education, higher parents' education, higher income, and living in a city over 50,000 population, with a moderately positive effect due to being Jewish (but not statistically significant in the classical music equation). Consistent with many prior discussions of its surprising complexity, age was modestly positive and statistically significant in only the classical music equation. Strong negative predictors of arts attendance were being male (controlling for sexual orientation), and having children, with being a Fundamentalist Protestant modestly negative and significant for dance performances (and negative but not significant for museums, and almost dropping out of the classical music equation entirely).

Summarizing this evidence regarding life-style, socialization and ethnicity variables (and including other variables such as having children, who within a household makes entertainment event choices, and an array of attitudinal variables), it cannot be said that the Andreasen and Belk (1980) "strong hypothesis" has been confirmed. Their conclusion that such variables eliminate from significance the standard socioeconomic variables of education, income, age and occupation (not to mention own price and substitute/complement prices, which were not addressed by that hypothesis) is too strong. However, despite the fact that some arts demand equations with very few variables have yielded useful results (e.g. Gapinski, 1984 using only own price and income, after dropping any substitute price measures, and Schimmelpfennig, 1997 using only price), any full understanding of the demand for the arts clearly cannot ignore this larger variety of important determinants.

Evaluation and Conclusions

The arts demand literature contains much diligent and insightful research, generally conducted under the customary constraints of empirical analysis, but also complicated by unique conceptual and data challenges presented by its target industry. Yet, despite the quality of many of these contributions, it is hard to dispute the Lévy-Garboua and Montmarquette (2003) assessment that critical issues remained unresolved. This is especially the case regarding the robustness and interpretation of the price inelasticity "consensus," the limited evidence regarding substitutes and complements (and the conventional wisdom that movie theaters present effective performing arts competition seems questionable), and the complex relative roles of the traditional socioeconomic demand determining variables and the vast array of specialized "lifestyle" and socialization factors.

[137] Their dependent variable = 1 for attended and 0 for did not attend in each of three equations for art museum, dance performance, and classical music. Results did not change using ordered logit when the three dummy variables were summed to get a proxy for "intensity of arts attendance."

There are also two common perceptions of important studies that are useful simplifications, yet have been shown to require clarification. Gapinski's (1986) analysis of substitution across different performing art forms (rather than with outside entertainments such as cinema, television or reading) did uniquely show the importance of considering inter-arts substitution, but did not directly address competitive effects within any one art form, and generated largely cross-price inelastic results that varied significantly in magnitude across individual arts companies and with simulated unilateral versus more unlikely coordinated price changes (see 3.2.4).[138] And Felton (1992) correctly stressed the theoretically correct proposition that aggregate (market or industry) price elasticities will be lower than firm price elasticities, but was hampered in empirically applying this to the arts by data limitations that allowed for few city (geographic market) observations to have multiple arts firms (and almost none with multiple companies in any one art form), a reality no doubt responsible for the high proportion of her individual arts companies that continued to reveal quite low price elasticities of demand (see 3.1). It can also be noted that, while the sophisticated analysis of Lévy-Garboua and Montmarquette (1996) had important indirect implications for the role of arts quality, as "self-discovered" by consumers via learning-by-consuming, it did not clarify the role of various independent measures of quality in affecting consumer decisions to attend arts performances.

Four other empirical results stand out:

(1) Income elasticities of demand for the arts cannot be adequately estimated without separating the real income effect from the opportunity cost of leisure pure substitution effect, an early Withers (1980) rationalization for the low "gross" income elasticities that are frequently estimated.

(2) Quality matters, although the mixed results from various objective and subjective measures suggest that we are not yet sure how best to capture this important determinant of variations in arts attendance and participation. Nevertheless, a multidimensional aggregation of various individual quality dimensions seems to capture quality effects better than a variety of individual measures (Throsby,1990); there is reasonable but not uniform evidence that the opinions of theater critics can affect attendance, although sometimes negatively, at least for some segments of the audience (Urrutiaguer, 2002); and the degree to which lowbrow popularized theater repertoires increase attendance appears smaller than commonly believed (i.e., usually but not always positive, and with relatively low elasticities).

(3) Some version of dynamics in consumption, be it passive inertia, learning-by-consuming, or the more complex rational addiction, should be incorporated to better understand arts demand, especially because these distinct notions have quite different implications for the optimal marketing strategies of arts managers.

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[138] As noted in Table 15, the definition of the substitute price for any one of the 13 arts organizations in Gapinski (1988) **did** include the prices of other intra-art form venues as part of the average ticket prices charged by all other companies, including, e.g., the three other symphony orchestras as well as all theater, dance and opera companies in the "symphony number one" equation. This study of resident, tourist, and combined demands for these London organizations generated no significant own or cross price results, in contrast to Gapinski (1986).

and (4) The survey study evidence (most notably from the Ford Foundation, 1974, Vol. II) favoring formal education as the most powerful determinant of variations in arts attendance has not been reliably strengthened by regression analysis. On this last point, however, it is perhaps significant that among the strongest econometric evidence confirming the primacy of education are three recent studies using relatively large databases and varying techniques (Peterson et al., 2000; Gray, 2003; Lewis and Seaman, 2004). Yet, the econometric evidence has also provided evidence favoring arts training, family socialization, and more specific forms of arts experience over general levels of formal education, and has sometimes produced evidence of a weak role for formal education in explaining arts demand variations when controlling for other determinants.

Regarding research improvements, the Lévy-Garboua and Montmarquette (2003) faith in the importance of well-defined taste cultivation models, larger databases and more sophisticated econometric modeling in improving our empirical models is understandable, but such analytical improvements to date have largely failed to generate substantial changes in the results or new insights about arts demand. This can be demonstrated by comparing the results of larger versus smaller databases, and more sophisticated theoretical and econometric modeling versus more "naive" approaches. By contrast, the most important areas for improvement may be the greater focus on disaggregated data, and a clearer definition of key variables such as own price, and substitute price, as well as a fuller appreciation for the importance of socialization variables in reducing the unexplained variation in consumption behavior (whether viewed as taste determinants or as Beckerian constraint variations).

It is extremely difficult to draw unambiguous conclusions about the unique effects of either sample size or econometric technique on the results of arts demand analysis, since studies differ in so many dimensions beyond those two. Furthermore, simply documenting the degree to which the empirical results are different across these dimensions does not necessarily address whether the results have "improved." Beyond the universal agreement that "sound" empirical methods be employed and that the choice of functional forms and variables would ideally stem from well-defined theoretical models (the second goal rarely achieved), the criteria for assessing improvement may vary. Blaug (2001, p. 126) praises Lévy-Garboua and Montmarquette (1996) for going "beyond all previous work on demand for the arts" in terms of their data (a large sample size), the number and variety of variables incorporated into their equations (as previously noted, a total of 58 with as many as 26 in an individual equation), and the novelty of their finding that the demand for theater in France may be price elastic.

However, despite the fact that those Lévy-Garboua and Montmarquette (1996) modeling features have indeed contributed to the clarification of the distinction between learning-by-consuming and rational addiction that also contributed to our understanding of how quality considerations might be incorporated into arts demand studies, they were not totally unique regarding the dimensions Blaug identifies. For example, Andreasen and Belk (1980), while a hybrid of regression and non-regression analysis (1980) examined 57 variables (many discussed above in 3.3) and certainly incorporated a wide variety of socioeconomic variables along with many socialization, lifestyle and attitudinal variables. Other non-regression studies also incorporate a large number of variables (e.g. Kolb 1997, based on a longer unpublished paper from 1996, considered 16 variables that explain "reasons why young people do not attend the arts;" see section 3.3)

Yet, with the further possible exceptions of Prieto-Rodríguez and Fernández-Blanco (2000), discussed in 3.2.3, and Corning and Levy (2002), who included many separate variables to capture the same basic effect (e.g. 11 monthly variables to capture theater seasonality; see 3.2.5), Blaug's (2001) "amended" point remains essentially correct that no other regression-based study has ever included as many as 26 "non-repetitive" independent variables in one equation (22 of which had coefficients with absolute value t-statistics above 2.0).[139] The practical payoff from the richness of those equations is questionable, however, inasmuch as even their own claims for their work may appear modest. They identify their construction of a measure of knowledge and taste for the theater, capturing "several aspects of the full price, objective quality of the outing and many socioeconomic variables," while confirming that the distinctive property of cultural goods "is their uniqueness or great differentiation" and that their "choice involves long learning processes"(p. 44). They also found evidence that televised theater broadcasts, cinema and reading are substitutes for live performances. One might argue that as early as Withers (1980) the role of the full price of attendance was well-established; that objective qualities of a performance were proven to be critical by Throsby (1990), and that while they included some novel socioeconomic and demographic variables (e.g. "has a telephone," "owns more than one automobile;" "owns a microcomputer"), such variables are either substitutes for the missing income variable (although they may also be proxies for the under-studied issue of "wealth"), or in the case of telephones and computers, identify trivial characteristics that may not distinguish among any relevant consumers. Furthermore, despite the underdeveloped topic of confirming the relevant product and geographic market in which the individual performing arts organizations compete, evidence has long existed for television broadcasts, cinema and even reading as potential gross substitutes for the lively arts, even if some of that evidence is weak (see 3.2.4).

The relatively large sample of 8,000 individuals 15 years and older in the Ministry of Culture survey, allowed Lévy-Garboua and Montmarquette (1996) to distinguish three samples: (1) an overall sample of 7,970; (2) a first subsample of those who had attended the theater in the previous four years (898); and (3) a second subsample, nested in the first one, n = 501, of those who had attended the theater within the past one year (p. 26). They were then able to better address the potential selectivity bias that often characterizes small samples, and did in fact find differences in the results using the two different subsamples. What may not be fully appreciated, however, is that in many other studies that rely on survey data (typically the Type P studies defined in 3.2.2 above)[140] the sample sizes were also quite large, suggesting that those studies were also likely to have avoided serious selectivity biases in their data.[141] In comparison to the two Lévy-Garboua and Montmarquette (1996) subsamples of 898 and 501

[139] Although, no other equation regardless of dependent variable or estimation technique had greater than 13 such coefficients with t-statistics greater than one in absolute value, with the lowest number being 8 in the probit equation estimating the probability of theater attendance during the last year; see Lévy-Garboua and Montmarquette, 1996, Table 1). Those with t-statistics less than one were not reported to allow for a more "parsimonious" presentation (p. 34).

[140] Some other studies rely only in part on data from audience or other surveys. For example, Moore (1966) reported that his cross-section data were developed via a personally conducted questionnaire survey of theater-goers, with a response rate of 26 percent of evening audiences, and 16 percent of those attending matinees (p. 79). But his time-series analysis did not rely on this survey data.

[141] Note that this issue is distinct from the number of observations that result from the frequent

(from an original 7,979), the sample sizes of the following 11 studies are:

> (1) Peterson et al. (2000): n = 17,135 from the 1997 SPPA; (2) Globerman and Book (1977): n = 13,750; (3) Ganzeboom (1989) reporting Hungarian results with n = 8,358; (4) Montgomery and Robinson (2005): n = 8,000; (5) Bajic (1985): n = 6,714; (6) Prieto-Rodríguez and Fernández-Blanco (2000): n = 6,632; (7) Goudriian and de Kam (1983): n > 5,000; (8) Abbé-Decarroux and Grin (1992): n = 4,000; (9) Lewis and Seaman (2004): n = 2,118; (10) Dobson and West (1989): n = 406; and (11) Ganzeboom (1989) reporting Dutch results with n = 369.

In addition to the likelihood that serious selectivity biases may have been avoided in the larger surveys (although steps were often taken to address this problem regardless of the survey size; e.g., Lewis and Seaman, 2004), it can be noted that the results regarding some key issues in arts demand do not show any systematic relationship to sample size, *ceteris paribus*. For example, regarding the issue of the importance of formal education, sample size studies ranging from very large to quite small in Peterson et al. (2000), Ganzeboom (Hungary), Lewis and Seaman (2004) to Ganzeboom (Netherlands) found a strong positive influence on arts attendance, while very weak effects of formal education were found in large sample size Bajic (1985) and small sample size Dobson and West (1989). Because it is very difficult to really impose *ceteris paribus* conditions on such comparisons, a fuller determination of how a broader array of results varies with sample size is nearly impossible.

Another comparison can, however, be made with more confidence: the degree to which "sophistication" of econometric technique generates differing results in arts demand analysis. Here, we are assisted by three direct comparisons of how, as only one reflection of this issue, standard OLS estimation varies from the more sophisticated 2SLS (two-stage least squares). It has been well established that Moore (1966) despite his belief that performing arts markets should not be estimated as a recursive process, actually found no evidence to suggest that the use of non-simultaneous estimation techniques (either OLS linear or multiplicative) affected his results in any way (see Table 11 and the discussion in 3.2.1). This result, more than any single reason, accounts for the relative dearth of simultaneous equation studies. Yet, when they have been attempted since 1966, Moore's essential conclusion has been essentially confirmed. While Luksetich and Lange (1995) do use 2SLS to estimate their symphony demand equations, their essential insight regarding the importance of incorporating donations and a "donor price" into the analysis (already established by their simpler methods in Lange and Luksetich, 1984) was primarily strengthened and elaborated upon rather than discovered by such analysis. More importantly, the evidence that simultaneity bias would have been significant from single equation estimation was not overwhelming (see fn. 93 above).

But the clearest statement regarding the relative unimportance of simultaneous equation methods in these studies was provided by Jenkins and Austen-Smith (1987). In comparing their OLS estimates with their 2SLS results, they cite a test proposed by Sargan (1958) to test for exogeneity by assessing

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pooling of time-series and cross-section data in "Type A" studies using more aggregated city or regional measures of many of the independent variables. Thus, a study based on data from 15 opera companies in 15 cities over 20 years can generate 300 observations without having any relevance to the adequacy of a sample size since typically no sample of the general population (or even of an audience) was used in that kind of study.

whether an OLS estimate lay within one (2SLS) standard error of the corresponding 2SLS estimate. They then conclude that, contrary to their prior expectations, the strong evidence for exogeneity they find in their explanatory variables in all of their equations, including their demand equation, means that "the OLS results for each equation should be preferred" since the data "suggest that the cross-equation statistical effects are relatively small in each case" (p. 166). This also provides further justification for those previously cited multi-equation studies that did, in fact, rely upon OLS estimation.

Extending the comparison of basic OLS to non-parametric techniques (including bivariate probit, tobit and logit estimation, as well as non-parametric linear regression without a binary dependent variable) is more problematic. Available data (i.e, the frequency with which survey data yield zero observations on arts attendance prompting the use of a binary dependent variable, or simply very small sample sizes that make parametric methods suspect), and not modeling sophistication itself, is the dominant reason for the use of such techniques. However, while the most common characteristic of studies using non-parametric techniques is that they are typically Type P studies (i.e. including independent variables personalized to individual consumers, but not including any localized arts price, other price, and organization size or quality variables, with Schimmelpfennig, 1997, an exception in that he lacked data for individual attenders), there is no clear difference in the results regarding the importance of education, age, or income compared to studies using non-parametric techniques.[142] However, Schimmelpfennig (1997) is an interesting example of both a small sample size (consisting of nine performances of two ballets during one season), and a resulting non-parametric technique (non-parametric linear regression with elasticities derived at median prices) that does indeed derive unusual results. But while his high price elasticities of demand and recommendation for price reductions so as to maximize revenues might be viewed as an example of results varying with sample size and technique, they are also (and likely more importantly) the result of his novel effort to estimate arts demand for specific seating sections of a theater.

However, the very databases that prompt the use of non-parametric techniques have often also allowed novel variables to be investigated that were relatively ignored (or excluded entirely) in the more traditionally specified Type A double-log OLS demand models. Examples include the DiMaggio and Ostrower (1990) study of the small but persistent effects of race, the Lewis and Seaman (2004) demonstration of the strongly positive effect of sexual orientation (and the difference between Jewish and Fundamentalist Protestant religious affiliation), and the Fernández-Blanco and Prieto-Rodriguez (2000) demonstration of the complementarity between sports and arts event consumption. Despite the importance of those results, they cannot be uniquely attributed to the relative superiority of non-parametric methods *per se*, but instead to their desirable attributes when dealing with binary dependent variables. In fact, DiMaggio and Ostrower (1990) utilized both OLS and logistic regression models en route to their conclusions and such techniques are often used in complementary ways.[143] While it is true

[142] In fact, even within Type P studies, results using OLS (e.g. Peterson et al., 2001) and those using non-parametric techniques (e.g. Lewis and Seaman, 2004) can be very similar. On the contentious issue of the importance of formal education versus income, both studies found strongly significant results for both variables (as well as parents' education), with formal education the somewhat stronger determinant.

[143] It was noted in 3.3 that DiMaggio and Ostrower used OLS for their scaled (typically 0-4) ordinal

that Montgomery and Robinson (2005) used OLS estimation in generating their finding of a greater degree of substitution between the arts and sports in the U.S. (at least in their budget constrained case) than that found by Fernández-Blanco and Prieto-Rodriguez for Spain using bivariate probit (2000), the estimation model alone did not dictate those results from studies using data from quite different countries, and with the Spanish survey generating less useful data.

Despite the lack of firm evidence that more complex econometric techniques are necessary to resolve the remaining enigmas in arts demand studies (especially when compared to obtaining more disaggregated data),[144] it is clear that applying additional theoretical structure to the derivation and interpretation of empirical results is warranted. It has been argued that this is necessary regarding the debate about the price elasticity of demand for the arts, and the choice of model specification may be particularly important regarding that issue. For example, some evidence from the sports literature has been cited to suggest that using an econometric specification that allows price elasticity to vary with price rather than remain constant (as with the common double-log formulation), and to adjust for possible price endogeneity, may be important in generating reliable price elasticity results (see 3.1.2, especially fn. 63). And the Pommerehne and Kirchgassner (1987) findings of income elasticities that varied somewhat by level of income, and the uncommon result of higher own price elasticities for theater than for cinema were derived using the rarely used restrictions of the almost ideal demand system model. Furthermore, the modeling effort of Globerman and Book (1977) is critical to a proper understanding of the role of education in arts demand, and is important to understanding some later research results that utilize the new theory of consumer behavior. Thus the Lévy-Garboua and Montmarquette (2003) call for more carefully done modeling, when combined with efforts to apply such models to less aggregated data, will doubtless be important to making further improvements in our understanding of the demand for the performing arts.

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dependent variables and logit for those dependent variables that remained dichotomous. However, since their ordinal variables were skewed to low values, they redefined those dependent variables in binary terms and re-ran those regressions with logit. Since they found results to be "substantially identical" using either OLS or logit, they reported the more easily interpreted OLS results for their performing and visual arts, consumption and production, dependent variables in their Table 2. See DiMaggio and Ostrower (1990, note 11, p. 775).

[144] Perhaps the best example of where more technical sophistication, at least in constructing some of the underlying independent variables is Urrutiaguer (2002), whose considerably more complex derivation of the dummy variables for the drama reviews variable compared to Throsby (1990) seemed to improve the strength of those variables in explaining per performance theater attendance. Yet even here, as shown in 3.2.5, most of estimated quality parameters were insignificant for the entire theater sample and better results were obtained only after segmenting the audience based on contrasting perceptions of the importance of media reputation in contrast to director reputation. This is consistent with the frequently made argument that using less aggregated data and exploring audience segments will generate more insightful results. Another key innovation was more conceptual than technique driven: the modification of the Throsby model to focus on the full record of theaters across all productions rather than just individual plays. Thus, more than just more sophisticated technical analysis was responsible for the Urrutiaguer (2002) results, which nevertheless did not also include the key Throsby (1990) approach of aggregating various technical performance criteria into a single composite subjective quality variable.

Yet, perhaps the most disappointing indication that such improvements may not come quickly is the lack of progress noted several times in this chapter in building upon three early key arts demand contributions, and the delay in generating a full extension of a fourth: (1) the just noted effort by Globerman and Book (1977) to analyze why education has an effect on arts consumption by explicitly testing for a consumption efficiency effect in a consumer household production framework;[145] (2) the Withers (1980) and Throsby and Withers (1979) sophisticated clarification of the pure income effect versus the price of leisure substitution effect on performing arts demand; (3) the Gapinski (1986) use of disaggregated data by arts companies in a specific geographic market to explore the possible inter-arts type (although not intra-arts type) substitution relationships (also related to the incomplete attempt by Felton (1992) to test for firm versus local market own price elasticity distinctions, which has also not be replicated); and (4) the delayed and partial response to the Throsby (1990;1983) demonstration that an aggregation of quality dimensions is likely to best capture the role of differential quality across arts organizations or across specific arts productions (an aggregation only partially addressed by the important and sophisticated contribution by Urrutiaguer, 2002; see 3.2.5).

The reason why no one should believe that any of these contributions are already "axiomatic" and not capable of generating a high professional payoff from revisiting can be shown by a few closing reminders of points already made about the Withers (1980) study. It is universally forgotten that the Withers (1980) results using American data were not able to be replicated even by Throsby and Withers (1979) themselves using relatively flawed Australian and Canadian data (see fn. 88 above). Even the U.S. results were derived only with highly aggregated data, and this chapter has shown that the level of data aggregation can have very significant effects on the results. Furthermore, the closest attempt to conduct a somewhat similar (but far less well-specified) analysis of the role of time costs (Ekelund and Ritenour, 1999) drew opposite conclusions regarding the broader significance of their results than those drawn by Withers (1980). Whereas Withers expresses optimism that the net income elasticity remains reasonably high even in the face of such time costs (in his conventional model), Ekelund and Ritenour (1999) express concern for the future of the performing arts if those opportunity costs are an important demand determinant (see section 3.2.1). While all cultural economists accept that the price of leisure is important to arts demand, and all studies make note of it as an explanation for surprisingly low estimated income elasticities, or even cite it as partial justification for the inclusion of age (or other) demand determining variables (e.g. Gray, 2003), these propositions remain more presumed that rigorously confirmed.

In fact, despite this chapter beginning with the fear that the least attentive lay person could probably guess at the determinants (and their relative importance) of the typical performing arts demand function, there are surprisingly few arts demand axioms beyond the confirmation that demand curves are negatively sloped (i.e., assuming any contrary results reflect own price being a proxy for quality), the performing arts are normal (but not necessarily luxury) goods, and that some positive cross-price elasticities can be identified. As stated by Lévy-Garboua and Montmarquette (1996, p. 26) after noting some general limitations of past arts demand studies, "it is nevertheless known that the performing arts are not exempt from the law of demand." Furthermore, while the econometric evidence is more mixed

[145] Although it was previously noted that its appearance in Volume 1 of the *Journal of Cultural Economics* has doubtless had an adverse effect in making it as well known as it deserves to be.

than generally thought, education in some form stands out as the most notable demand shifting variable, although the precise reasons for that result remain controversial.

There have unquestionably been many well-executed and revealing empirical studies of arts attendance and participation rates that have also been highly suggestive regarding the role of arts quality and an array of so-called lifestyle or socialization variables. The quality of the modeling and the data are improving and progress is being made despite some legitimate skepticism about how critical technical sophistication alone has been to that process. But given the misperceptions about some of the most quoted of the previous results, and the gap between myth and reality of core propositions, empirical arts demand studies remain a surprisingly rich area for further sound economic analysis.

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